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1992 HAMILTON-WENTWORTH COLLISION REPORT

PREPARED BY:
THE CITY OF HAMILTON TRAFFIC DEPARTMENT

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GOVERNMENT DOCUMENTS

1992 HAMILTON-WENTWORTH MOTOR VEHICLE COLLISION REPORT

Introduction

This annual report is a summary of factors associated with traffic collisions that occurred in the Regional Municipality of Hamilton-Wentworth in 1992.

The Regional Municipality of Hamilton-Wentworth is situated in southern Ontario, at the westerly end of Lake Ontario. The following Municipalities are located within the Region: The Town of Ancaster, The Town of Dundas, The Township of Flamborough, The Township of Glanbrook, The City of Hamilton and The City of Stoney Creek. The projected total population of these combined localities was 459,090 in 1992 (based on 1991 population data).

Traffic collisions are a primary cause of accidental deaths, injuries and associated property losses. The intention of this report is to provide factual information to those agencies and persons concerned with the safety of the roadway transportation system within the Regional Municipality of Hamilton-Wentworth.

Traffic collisions frequently involve complex interactions between human behaviour, vehicle characteristics, and environmental conditions. The factor or factors responsible for causing a collision are not always the most obvious nor are they always readily apparent. Caution should be exercised in drawing conclusions from the statistics presented in this report and conclusions should be drawn only with appropriate qualifications and supportive information.

The information presented in this report is based primarily upon motor vehicle collisions investigated by the Hamilton-Wentworth Regional Police. All collisions occurring in Hamilton-Wentworth are included in the statistics in this report excluding collisions occurring on the Queen Elizabeth Way and Highway 403 and on-ramps and off-ramps to those highways. Collisions occurring on service roads to the Q.E.W. are included.

EXECUTIVE SUMMARY

* In 1992, 6,180 reported traffic collisions occurred on municipal roadways in the Regional Municipality of Hamilton-Wentworth. These collisions resulted in:

- 14 driver or passenger fatalities (7 motor vehicle drivers, 3 cyclists and 4 riders/passengers)
- 9 pedestrian fatalities
- 3,142 driver, cyclist or passenger injuries (not including fatalities)
- 297 pedestrian injuries (not including fatalities)
- 17,789 persons (equal to approximately 5 percent of the Regional population) being involved in a reported traffic collision

* The overall frequency of collisions in Hamilton-Wentworth is generally lower than other major Canadian municipalities.

* The frequency rate of fatalities in the City of Hamilton is generally lower than other Canadian and U.S. cities of similar population.

* The period from midnight to 5 a.m. exhibits the highest ratio of collisions to vehicle volume using the street system.

* Drivers under the age of 35 years were involved in a disproportionate number of collisions relative to the age distribution of the licensed driving population of Ontario.

* The predominant improper driver action indicated in collisions was "failed to yield right-of-way".

* 6.4 percent of reported collisions involved one or more drivers who had been drinking.

* Most collisions involving alcohol occurred in the evening from 5 p.m. to 3 a.m. These figures are indicative of alcohol being present in the bloodstream of one or more of the drivers involved in the collision and do not necessarily mean that alcohol was the proximate cause of the collision.

* Pedestrians between the ages of 5 and 19 years of age were involved in a disproportionate number of collisions based on the age distribution of the population of Hamilton-Wentworth. Pedestrians in this age group were most frequently involved in a collision as the result of entering the roadway unexpectedly or coming from behind a parked vehicle.

1992 COMPARED WITH PREVIOUS YEARS

1. Overall Collisions

Thirty-five more collisions occurred in 1992 than in 1991. Since 1989 the number of collisions has generally been decreasing (1991 to 1992 saw a slight increase of 0.6%). Consistent with this decrease in collisions, the occurrence of injury collisions was slightly lower than 1991. The number of recorded collisions in 1992 is the lowest since 1961 (with the exception of 1991) and the number of injury collisions is the lowest since 1963.

2. Bicycle Injuries

The number of people injured in motor vehicle collisions while riding on a bicycle increased by 24 from 1991 to 1992. However, when the years are 1989 - 1992 are compared to past years (1985 - 1988), the number of cyclists injured appears to be declining.

3. Pedestrian Collisions Involving Five to Nine Year Olds

Collisions involving five to nine year old pedestrians remained constant with 54, 53, and 49 collisions occurring in the years 1989, 1990, 1991 respectively; 1992 recorded a low of 41 collisions. For comparison, data for the years 1980 through 1983 were 90 collisions, 72 collisions, 107 collisions and 79 collisions respectively. In 1988 there were 75 collisions. Although data for the years 1984 to 1987 is not available, it would appear that the number of collisions involving five to nine year olds is declining.

4. Alcohol Involvement

Alcohol involvement in motor vehicle collisions has been, on average, steadily decreasing since 1978. In the years 1988 to present, alcohol involvement in collisions averaged 6.3 percent, compared to 10.3 percent for the previous 12 years.

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1992 COMPARED WITH PREVIOUS YEARS

	<u>Page</u>
CHAPTER ONE - TRENDS	1
General	3
Normalizing The Data	3
Collisions	3
Injuries	4
Fatalities	4
Alcohol Involvement	4
CHAPTER TWO - SELECTED CHARACTERISTICS	15
Injuries	17
Time of Occurrence	17
Impact Type	18
CHAPTER THREE - DRIVERS	27
Driver Age	29
Drinking Drivers	29
Cyclists	29
CHAPTER FOUR - PEDESTRIANS	39
General	41
Age	41
Pedestrian Action	41
Time of Collision	41
Pedestrian Condition	42
Location	42
Driver Action	42
Pedestrian Injuries	42

CHAPTER FIVE - ENVIRONMENT	55
Weather and Light Conditions	57
Road Surface	57
Pavement Marking	57
Road Characteristics	57
Road Location	58
Fixed Objects	58
CHAPTER SIX - LOCATIONS	67
General	69
Area Municipality	69
High Frequency Intersection Locations	69
Comparison of Hamilton and	70
Hamilton-Wentworth with Other Cities	

LIST OF EXHIBITS

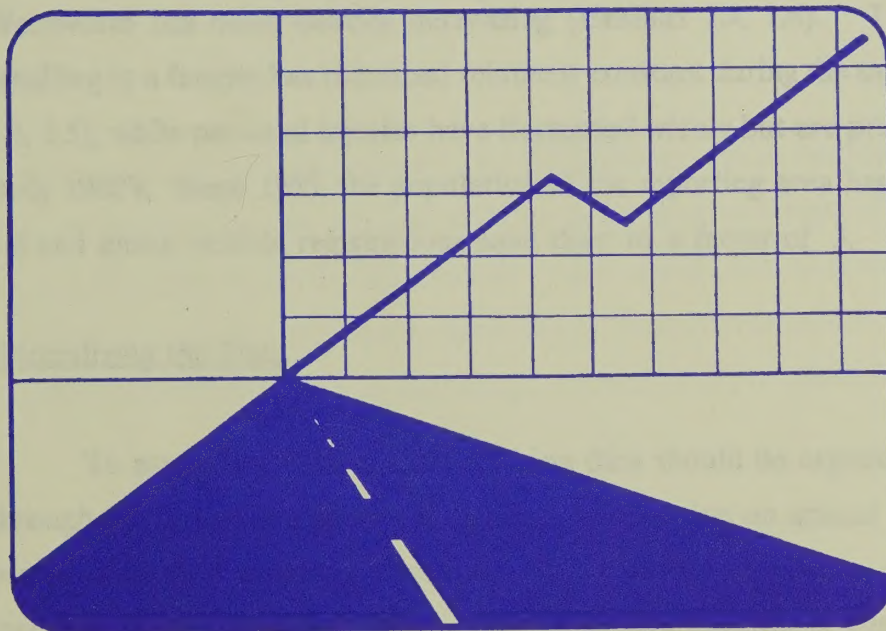
EXHIBIT		PAGE
1.1	Motor Vehicle Collisions: History of Rates of Total Collisions and of Collisions Causing Injury/Fatality (1960-1992)	6
1.2	Personal Injuries/Fatalities: History of Injury and Fatality Rates Caused by Motor Vehicle Collisions (1960-1992)	7
1.3	Pedestrians Involved in Collisions: History of Injury and Fatality Rates (1960-1992)	8
1.4	Motor Vehicle Collision History (1962-1992)	9
1.5	History of Personal Injuries and Fatalities Caused by Motor Vehicle Collisions (1962-1992)	10
1.6	History of Pedestrian and Cyclist Injuries/Fatalities (1962-1992)	12
1.7	History of Alcohol-Related Motor Vehicle Collisions (1977-1992)	13
2.1	Injury Status of all Persons Involved	19
2.2	Time of Day vs Traffic Volume	20
2.3	Collision Occurrences vs Time of Day and Day of Week	21
2.4	Day of Week vs Collisions and Volume	22
2.5	Collisions vs Month of the Year	23
2.6	Initial Impact Type vs Class of Collision	24
2.7	Initial Impact Type vs Road Classification	25
2.8	Initial Impact Type vs Type of Traffic Control	26
3.1	Motor Vehicle Driver Age vs Collision Involvement	30
3.2	Motor Vehicle Driver Age vs Driver Action	31
3.3	Alcohol Involvement vs Collision Classification	32
3.4	Collisions Involving Alcohol vs Time of Day and Day of Week	33

3.5	Driver Action vs Driver Condition	34
3.6	Driver Age vs Driver Condition	36
3.7	Cyclist Actions in Motor Vehicle Collisions: Percentage Riding Properly vs Age Group	37
4.1	Pedestrian Age vs Collision Involvement	43
4.2	Pedestrian Age vs Pedestrian Action (All Locations)	44
4.3	Pedestrian Age vs Pedestrian Action (At Traffic Signals)	46
4.4	Time of Day vs Number of Pedestrians Injured	48
4.5	Time of Day vs Pedestrian Age	49
4.6	Condition of Pedestrians Involved in collisions	50
4.7	Type of Traffic Control at Locations Where Pedestrian Collisions Occurred	51
4.8	Driver Action in Pedestrian Collisions	52
4.9	Pedestrian Age vs Injury Status	53
5.1	Weather and Light Conditions in Motor Vehicle Collisions	59
5.2	Road Surface Conditions in Motor Vehicle Collisions	60
5.3	Pavement Markings in Motor Vehicle Collisions	61
5.4	Road Alignment (Non-Intersection and Intersection) in Motor Vehicle Collisions	62
5.5	Road Characteristics (Non-Intersection and Intersection) in Motor Vehicle Collisions	63
5.6	Location of Collisions	64
5.7	Types of Fixed Objects Struck in Motor Vehicle Collisions	65
6.1	Collisions vs Area Municipality	71
6.2	Intersections with the Highest Number of Collisions in 1992	72

6.3	Signalized Intersections With the Highest Collisions Rates in 1992	74
6.4	Roadway Sections with the Highest Collision Rates, 1988-1992 City of Hamilton Arterials, All Intersections Included	77
6.5	Roadway Sections with the Highest Collision Rates, 1988-1992 City of Hamilton Arterials, Signalized Intersections Not Included	79
6.6	Roadway Sections with the Highest Collision Rates, 1988-1992 City of Hamilton Arterials, Intersections Not Included	80
6.7	1991 Collision Statistics - Selected Canadian Cities	81
6.8	Fatal Collision Statistics	85

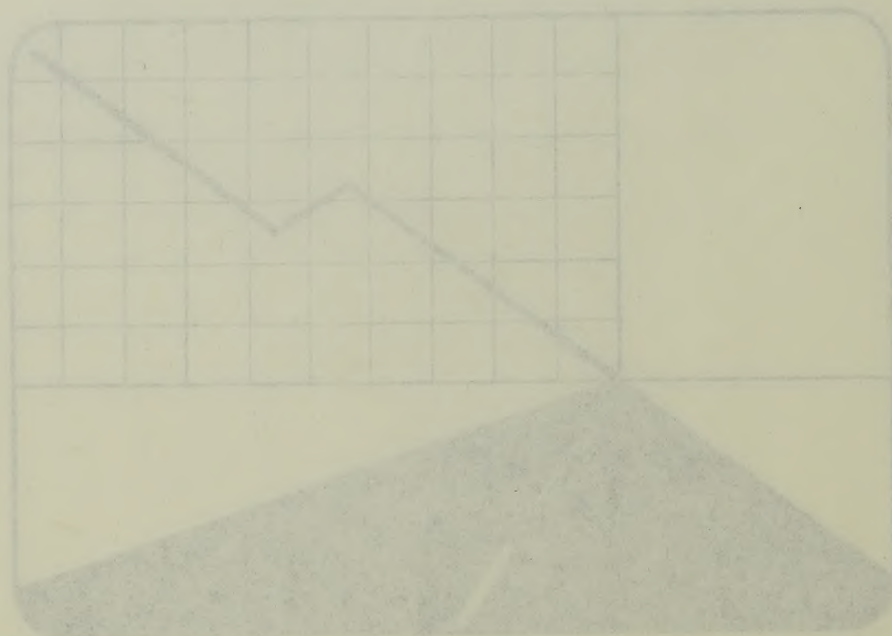
Chapter One

Trends

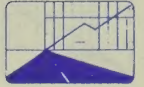


Chapter One

Trends



Trends Chapter One



Chapter 1

General

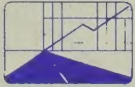
Since peaking in 1965 the overall number of motor vehicle collisions, and the number of pedestrians injured in motor vehicle collisions in the Regional Municipality of Hamilton-Wentworth has been steadily decreasing (Exhibits 1.4, 1.6). The number of collisions resulting in a fatality has remained relatively constant during the same time period (Exhibits 1.4, 1.5), while personal injuries have fluctuated widely but are presently at the level of the early 1960's. Since 1965, the population of the reporting area has increased by a factor of 1.6 and motor vehicle registrations have risen by a factor of 3.

Normalizing the Data

To assess historical trends, collision data should be expressed as a normalized rate through the use of one of several factors. Information on annual motor vehicle use would provide the most accurate assessment of a motorist's exposure, and hence, likelihood of involvement in a collision. Motor vehicle registration data is somewhat less accurate as a normalizing factor, but is utilized since exposure information is not available. Population also provides a suitable and accurate normalizing factor. Exhibits 1.1, 1.2, 1.3 and associated analysis in this chapter refer to data which has been calculated on a population *rate* basis (based on 1991 population data).

Collisions

The overall motor vehicle collision rate is shown in Exhibit 1.1. As of January 1, 1978, the reporting level for property damage only collisions was raised from \$200.00 to \$400.00. In January 1, 1985, it was raised again from \$400.00 to \$700.00. Due to these changes, trend analysis cannot be conducted on property damage collisions (Exhibit 1.4). The rate for total collisions appears to show a decline from 1977 to 1992. However, due to the changes in the reporting criteria and reporting area (this reporting area increased in



1974) for the period for which historical data are available, trend analysis on the number of collisions would not be appropriate or meaningful.

The rate of collisions involving injury or fatality shows a modest decline from 1973 to 1992 (Exhibit 1.1). Individual trends of injuries and fatalities are discussed below.

Injuries

The rate of personal injury (Exhibits 1.2, 1.5) is rather volatile. However since 1989, the rate of personal injuries has been on the decline and the rate of personal injury from 1990 - 1992 is the lowest its been since 1961. This volatility is likely related to the nature and severity of the collisions which could be the result of a number of factors. The rate for pedestrian injuries (Exhibits 1.3, 1.6) shows a significant decline from 1966 to 1992.

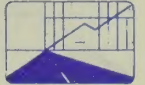
Fatalities

In 1992, twenty-two persons died in motor vehicle collisions in Hamilton-Wentworth. Since fatal collisions are rare events, small changes in the number of fatalities cause large fluctuations in the fatality rate (Exhibit 1.2, 1.4). These fluctuations reduce the validity of statistical tests. Thus while the fatality rate for personal fatalities shows a slight downward trend, especially since 1978, this trend is not statistically significant.

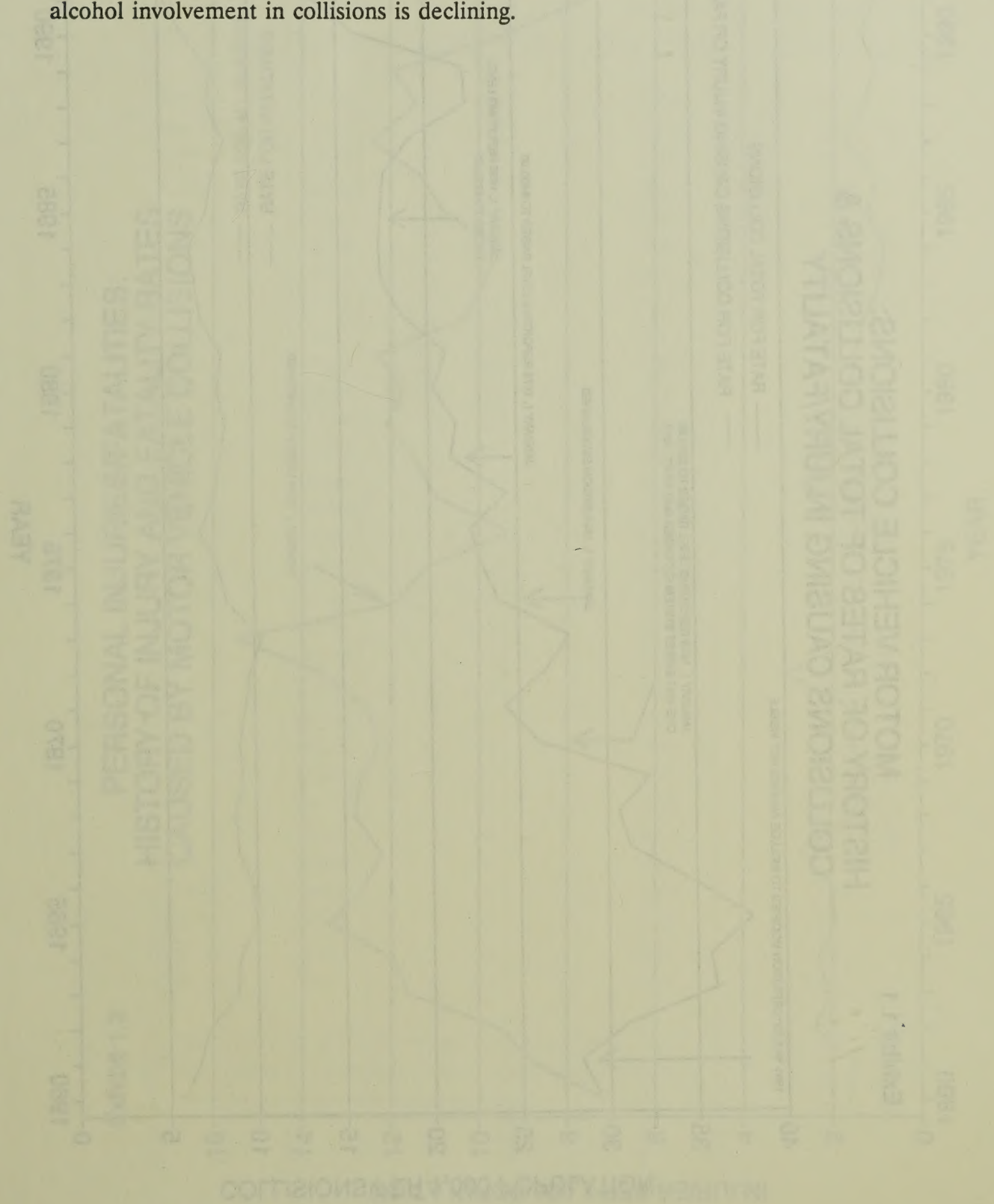
The fatality rate for pedestrians (Exhibit 1.3, 1.6) does display a significant reduction, especially since 1978.

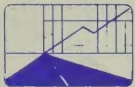
Alcohol Involvement

When viewed as a proportion of overall collisions, alcohol involvement (Exhibit 1.7) has been, on average, steadily decreasing since 1978. In the years 1988 to 1992 collision involvement remained relatively constant with an average of 6.1 percent which is 4.2 percent lower than the previous 12 year average of 10.3 percent. The percentage of total fatal collisions that were alcohol related has been generally decreasing since 1984, with the exception of 1989. An average of 17 percent of all fatal collisions between 1984 and the



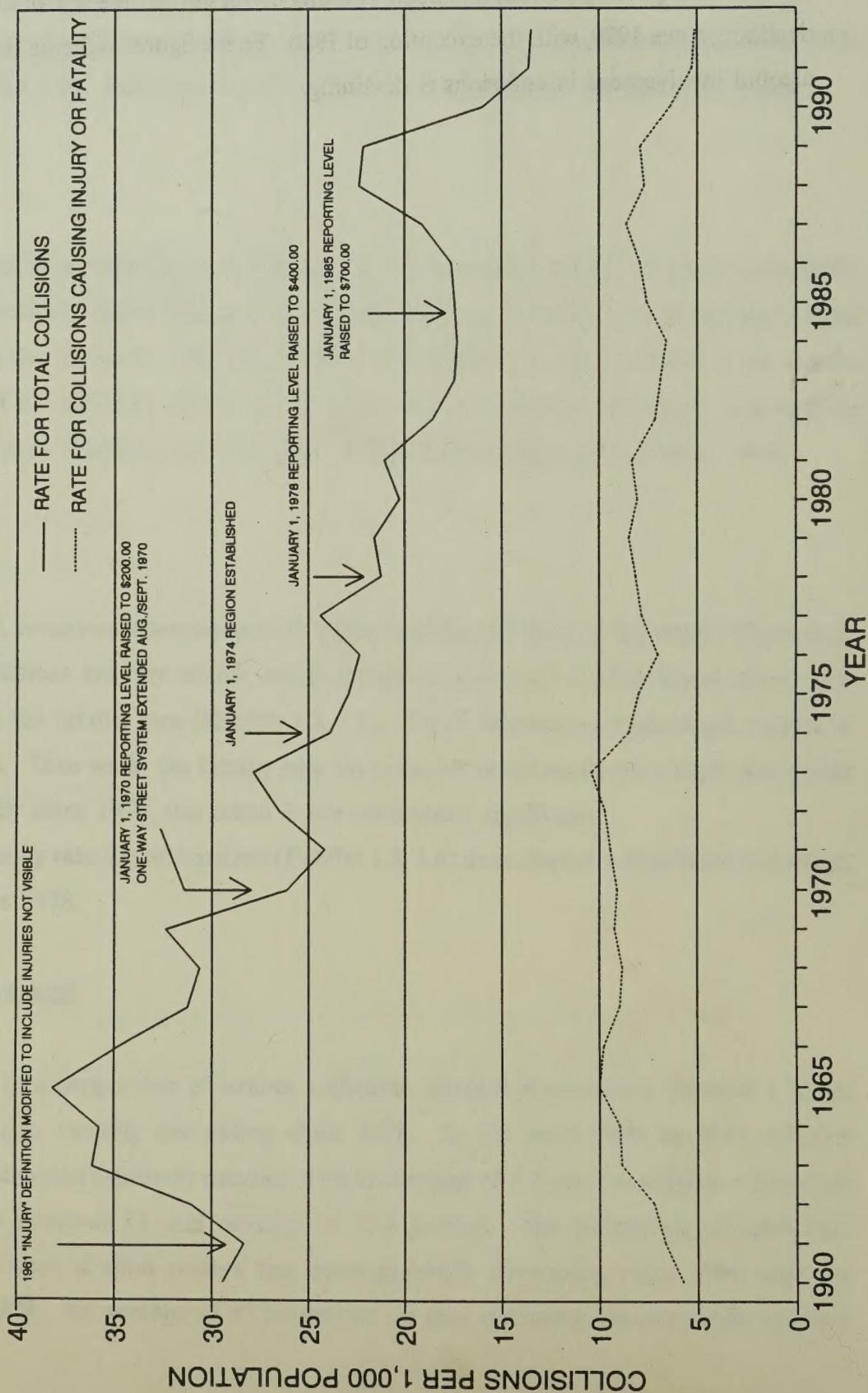
present have been alcohol related, with the average for the past three years being 9 percent. The percentage of impaired/had been drinking drivers under the age of 21 has steadily been declining since 1979, with the exception of 1986. These figures indicate that, in recent years, alcohol involvement in collisions is declining.

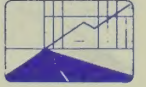




MOTOR VEHICLE COLLISIONS: HISTORY OF RATES OF TOTAL COLLISIONS & COLLISIONS CAUSING INJURY/FATALITY

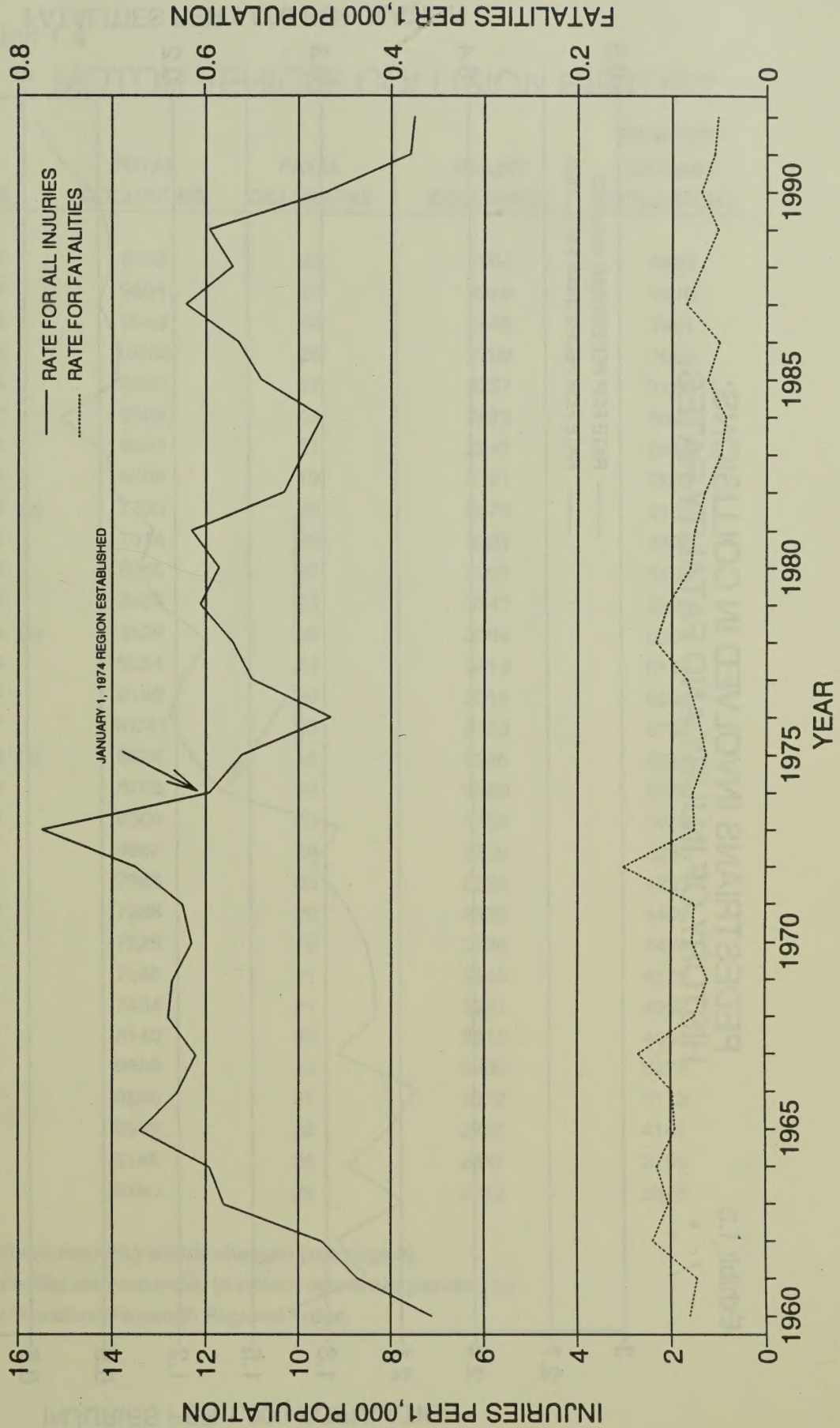
Exhibit 1.1

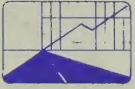




PERSONAL INJURIES/FATALITIES: HISTORY OF INJURY AND FATALITY RATES CAUSED BY MOTOR VEHICLE COLLISIONS

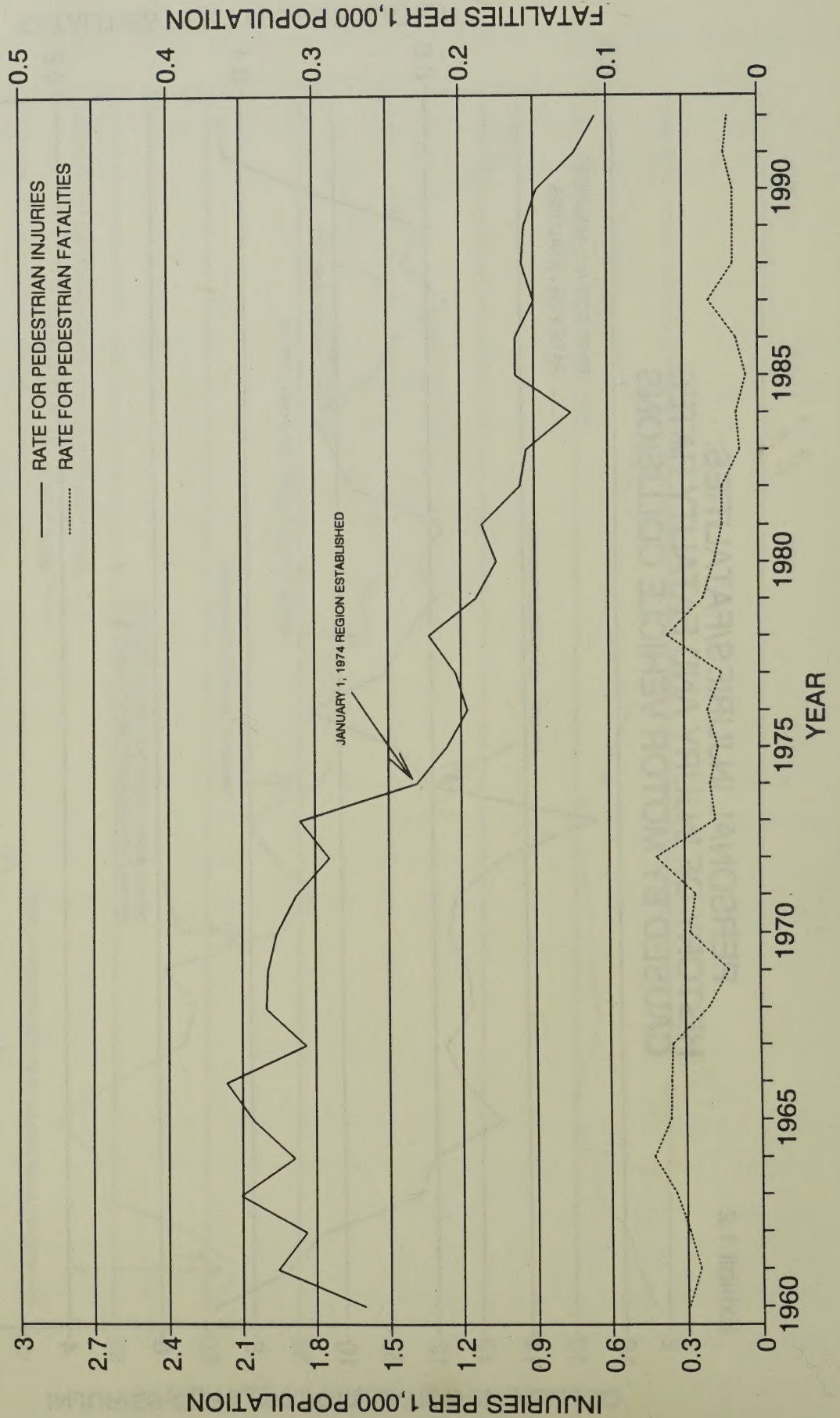
Exhibit 1.2





PEDESTRIANS INVOLVED IN COLLISIONS: HISTORY OF INJURY AND FATALITY RATES

Exhibit 1.3



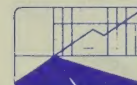


Exhibit 1.4

MOTOR VEHICLE COLLISION HISTORY

YEAR	TOTAL COLLISIONS	FATAL COLLISIONS	INJURY COLLISIONS	PROPERTY DAMAGE COLLISIONS
1962	8338	28	1904	6406
1963	9554	27	2309	7218
1964	9948	32	2455	7461
1965	10783	26	2789	7968
1966	9950	27	2757	7166
1967	9106	35	2575	6496
1968	8983	21	2547	6415
1969	9589	19	2721	6849
1970 (a)	7799	23	2676	5100
1971	7314	22	2821	4471
1972	8065	39	2901	5125
1973	8499	23	3143	5333
1974 (b)	9599	29	3364	6206
1975	9354	24	3219	6111
1976	9146	28	2816	6302
1977	10011	33	3182	6796
1978 (a)	8636	45	3246	5345
1979	8798	39	3389	5370
1980	9305	33	3253	5019
1981	8660	28	3398	5234
1982	7663	23	2939	4701
1983	7268	20	2839	4409
1984	7228	18	2726	4484
1985	7346	21	3153	4172
1986	7434	21	3331	4082
1987	8140	35	3615	4491
1988	9586	22	3285	6279
1989	9566	21	3372	6173
1990	6917	25	2751	4141
1991	6145	25	2331	3789
1992	6180	22	2312	3846

(a) Collision reporting criteria changed (see page 3).

(b) Reporting area expanded to include new areas patrolled by the Hamilton-Wentworth Regional Police.

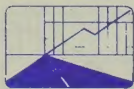
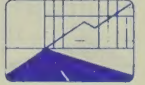


Exhibit 1.5

HISTORY OF PERSONAL INJURIES AND FATALITIES CAUSED BY MOTOR VEHICLE COLLISIONS

YEAR	TOTAL COLLISIONS	PERSONS INJURED	PERSONAL		NUMBER OF FATALITIES	FATALITIES/	
			INJURIES/1,000 POPULATION	10,000 REGISTERED VEHICLES		100,000 POPULATION	10,000 REGISTERED VEHICLES
1962	8338	2542	9.5	32	11.9	3.82	
1963	9554	3075	11.6	27	10.2	3.03	
1964	9948	3305	11.9	32	11.5	3.43	
1965	10783	3824	13.4	27	9.5	2.64	
1966	9950	3746	12.6	28	9.8	2.60	
1967	9106	3484	12.2	39	13.7	3.63	
1968	8983	3573	12.8	22	7.9	1.89	
1969	9589	3768	12.7	19	6.4	1.64	
1970 (a)	7799	3717	12.3	23	7.5	2.00	
1971	7314	3876	12.5	23	7.0	1.91	
1972	8065	4055	13.5	46	15.3	3.42 (b)	
1973	8499	4951	15.5	23	7.2	1.63	
1974 (c)	9599	4678	11.9	31	7.9	2.00 (b)	
1975	9354	4474	11.2	26	6.5	1.60 (b)	
1976	9146	3811	9.3	29	7.1	1.78 (b)	
1977	10011	4513	11.0	34	8.3	2.00 (b)	
1978 (a)	8636	4635	11.4	47	11.6	2.06 (d)	
1979	8798	4923	12.1	42	10.3	2.20 (d)	
1980	8305	4800	11.7	33	8	1.43 (d)	
1981	8660	5015	12.3	31	7.6	1.12 (d)	
1982	7663	4175	10.3	27	6.6	0.91	
1983	7268	4041	9.9	20	4.9	1.05 (e)	



1984	7228	3855	9.5	18	3.8	0.83 (e)
1985	7346	4529	10.8	26	6.2	1.16 (e)
1986	7434	4758	11.3	21	5	0.90 (e)
1987	8140	5220	12.4	36	8.4	1.50 (e)
1988	9586	4898	11.4	29	6.8	1.17 (e)
1989	9566	5145	11.9	22	5.1	0.87 (e)
1990	6917	4053	9.4	30	6.9	1.18 (e)
1991	6145	3420	7.6	25	5.5	0.96 (d)
1992	6180	3439	7.5	23	5.0	0.75 (e)

(a) Collision reporting criteria changed (see page 3).

(b) Registration estimated from total Ontario registrations.

(c) Reporting area expanded to include new areas patrolled by the Hamilton-Wentworth Regional Police.

(d) Registration data from licence information.

(e) Registration data from licence information for Wentworth County.

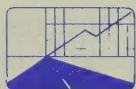


Exhibit 1.6

HISTORY OF PEDESTRIAN AND CYCLIST INJURIES AND FATALITIES

YEAR	COLLISIONS INVOLVING PEDESTRIANS	PEDESTRIANS INJURED	PEDESTRIAN FATALITIES	COLLISIONS INVOLVING CYCLISTS	CYCLISTS INJURED	CYCLIST FATALITIES
	(c)	(a)		(c)	(a)	
1962		495	13		126	1
1963		558	15		120	1
1964		526	20		120	0
1965		582	17		140	0
1966		618	17		132	1
1967		537	17		113	0
1968		588	10		84	1
1969		602	6		91	2
1970		586	14		101	1
1971		570	13		155	2
1972		530	21		156	2
1973		569	9		197	1
1974 (b)		555	13		192	3
1975		513	11		235	0
1976		480	14		195	0
1977		503	10		193	3
1978		542	25		162	1
1979		464	15		177	4
1980		434	12		178	1
1981		458	10		159	1
1982		396	10		252	2
1983		387	5		200	2
1984		314	6		175	1
1985		410	3		239	2
1986	384	412	6	229	228	2
1987	379	383	14	244	244	2
1988	401	406	7	239	225	0
1989	411	403	7	164	154	3
1990	381	383	7	208	195	0
1991	332	330	10	193	185	3
1992	300	297	9	219	209	3

(a) One or more pedestrian\cyclist could be involved and a fatality\injury may not have occurred.

(b) Prior to this year, reporting was for the City of Hamilton only.

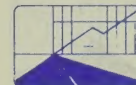
(c) This information was not available until 1986.

Exhibit 1.7

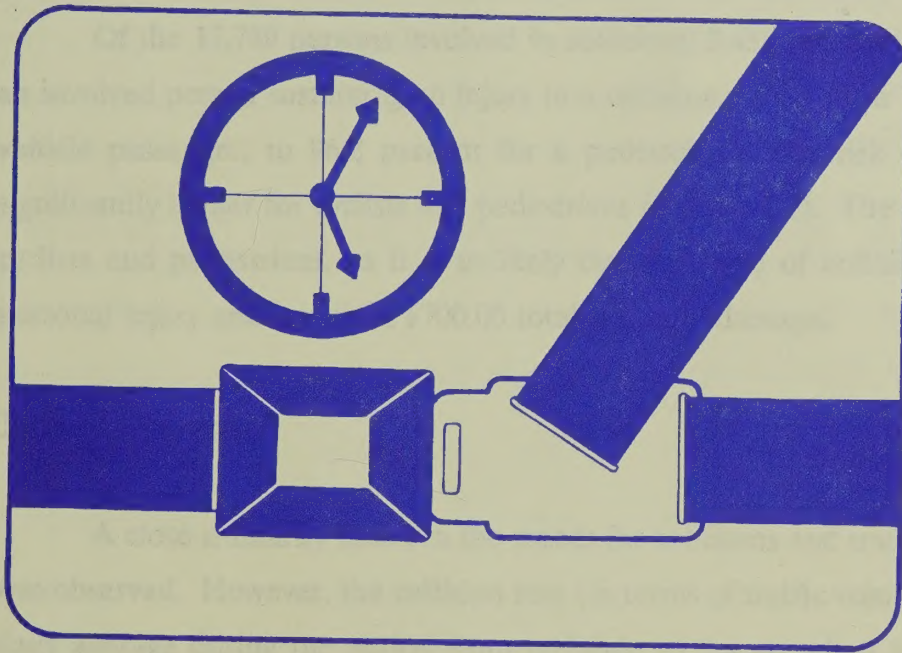
HISTORY OF ALCOHOL-RELATED MOTOR VEHICLE COLLISIONS

YEAR	TOTAL REPORTED COLLISIONS	TOTAL ALCOHOL- RELATED COLLISIONS (a)	PERCENTAGE OF TOTAL COLLISIONS INVOLVING ALCOHOL	IMPAIRED OR HAD BEEN DRINKING DRIVERS UNDER THE AGE OF 21	TOTAL FATAL COLLISIONS	ALCOHOL- RELATED FATAL COLLISIONS (a)	% FATAL COLLISIONS HAVING ALCOHOL INVOLVED
1977	10011	1175	11.7	20.4	33	5	15.2
1978	8636	1128	13.1	22.1	45	11	24.4
1979	8798	1139	12.9	22.1	39	5	12.8
1980	8305	929	11.2	18.7	33	11	33.3
1981	8660	1053	12.2	16.4	28	8	28.6
1982	7663	895	11.7	19.0	23	3	13.0
1983	7268	765	10.5	18.6	20	5	25.0
1984	7228	729	10.1	15.0	18	5	27.8
1985	7346	644	8.8	12.7	21	5	23.8
1986	7434	596	8.0	20.5	21	4	19.0
1987	8140	589	7.2	11.9	35	5	14.3
1988	9586	582	6.1	9.9	22	2	9.1
1989	9566	542	5.7	6.7	21	6	28.6
1990	6917	430	6.2	6.6	25	4	16.0
1991	6145	385	6.3	7.6	25	3	12.0
1992	6180	398	6.4	2.1	22	0	0.0

(a) Includes drivers classified as impaired due to alcohol or classified as having been drinking (refer to Exhibit 3.5 for a more detailed description of categories).



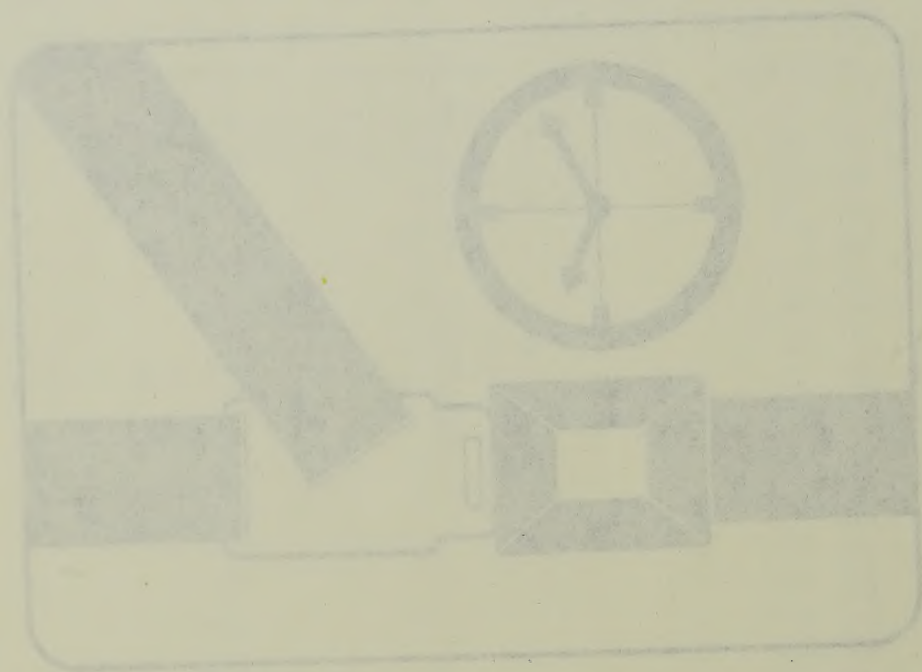




Chapter Two

Selected

Characteristics



Chapter Two Selected Characteristics



Chapter 2

Injuries

Of the 17,789 persons involved in collisions, 3,439 received injuries. The chance of an involved person sustaining an injury in a collision varied from 16.4 percent for a motor vehicle passenger, to 96.2 percent for a pedestrian. The risk of injury appears to be significantly higher for cyclists and pedestrians (Exhibit 2.1). The percentages are high for cyclists and pedestrians, as it is unlikely that this type of collision could occur with no personal injury and less than \$700.00 total property damage.

Time of Occurrence

A close similarity between the trends for collisions and traffic volumes (Exhibit 2.2) was observed. However, the collision rate (in terms of traffic volume) was greater than the daily average during the period from midnight to 5 a.m., when 580 or 9.4 percent of all collisions occurred. This may be due to driver conditions such as fatigue or alcohol impairment (refer to Exhibit 3.4 which shows that most collisions involving alcohol occurred in the evening).

The pattern of collision occurrences by time of day and day of week was summarized, and the differences found in the pattern of collision occurrence reflected traffic volumes. The highest number of collisions occurred between the hours of 3 p.m. to 5 p.m. (Exhibit 2.3) with the highest percentage of collisions occurring on Fridays (Exhibit 2.4).

The pattern of collision occurrences was compared on a month of year basis (Exhibit 2.5) and there was a difference in the number of collisions which occurred each month. The higher number of collisions occurred during the winter months which may be due to drivers not adjusting to adverse weather and roadway conditions.



Impact Type

The type of initial impact was compared with the injury classification of the collisions (Exhibit 2.6). The probability of an injury or fatality resulting from a collision was highest in "head on" (49.6%) and "pedestrian/vehicle" (98.3%) collision types. However, these collision types only make up 7 percent of the total collisions. The majority of collisions were either "rear end" (1469) or "right angle" (1343) in nature.

Greater than one half of all collisions were associated with intersections (Exhibit 2.7). 34.4 percent of collisions occurred at signalized intersections and 29.7 percent occurred at intersections with stop or yield control (Exhibit 2.8).

35.5 percent of all collisions occurred at locations with no form of traffic control.



Exhibit 2.1

INJURY STATUS OF ALL PERSONS INVOLVED

SELECTED
CHARACTERISTICS

DESCRIPTION OF PERSONS INVOLVED	PERSONS INVOLVED	PERSONAL INJURIES & FATALITIES	% OF PERSONS INJURED/ PERSONS INVOLVED	TYPE OF INJURY*			
				FATAL	MAJOR	MINOR	MINIMAL
DRIVER	10533	1845	17.5%	7	85	704	1049
CYCLIST	223	212	95.1%	3	15	84	110
PASSENGER	6715	1099	16.4%	4	53	374	668
PEDESTRIAN	318	306	96.2%	9	50	139	108
TOTAL	17789	3462	19.5%	23	203	1301	1935

FOR APPROXIMATELY EVERY 25 RESIDENTS OF THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH, 1 PERSON WAS INVOLVED IN A MOTOR VEHICLE COLLISION IN 1992.

THERE WAS APPROXIMATELY A 1 IN 5 CHANCE THAT A PERSON INVOLVED IN A TRAFFIC COLLISION WOULD BE INJURED.

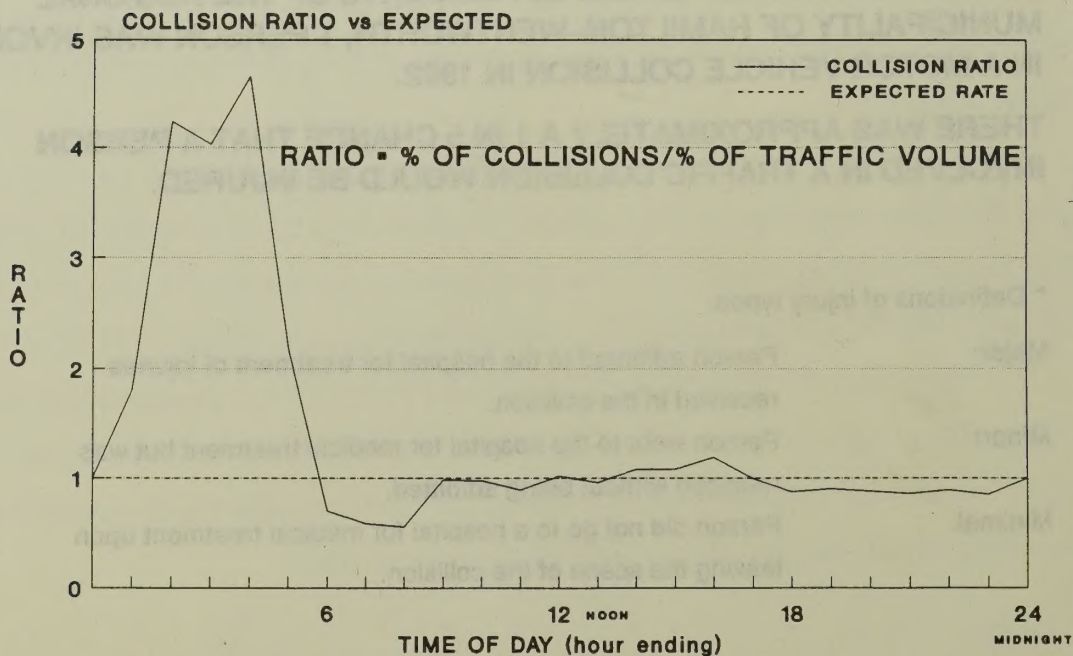
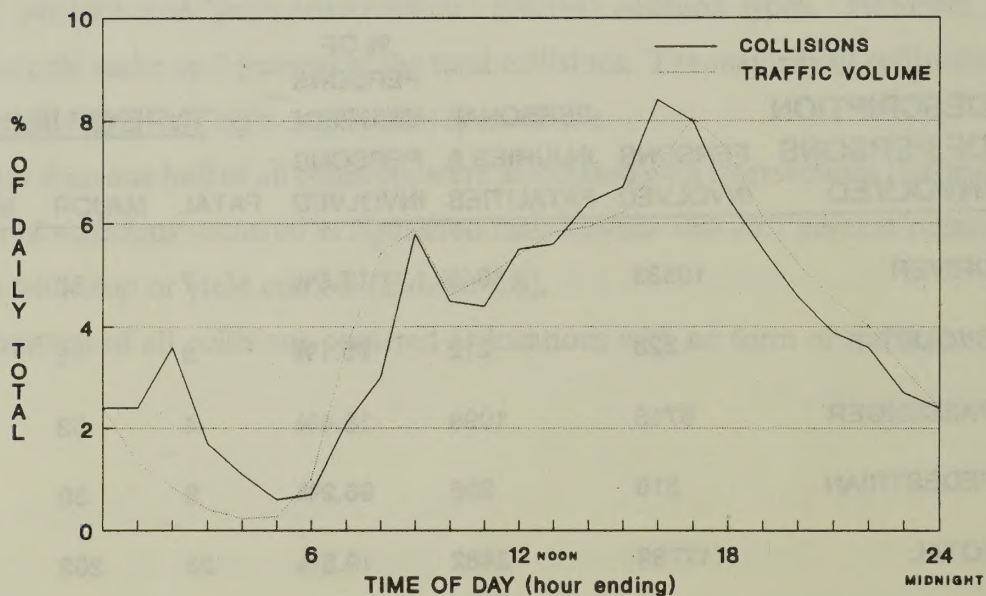
* Definitions of injury types:

- Major: Person admitted to the hospital for treatment of injuries received in the collision.
- Minor: Person went to the hospital for medical treatment but was released without being admitted.
- Minimal: Person did not go to a hospital for medical treatment upon leaving the scene of the collision.



Exhibit 2.2

TIME OF DAY vs TRAFFIC VOLUME



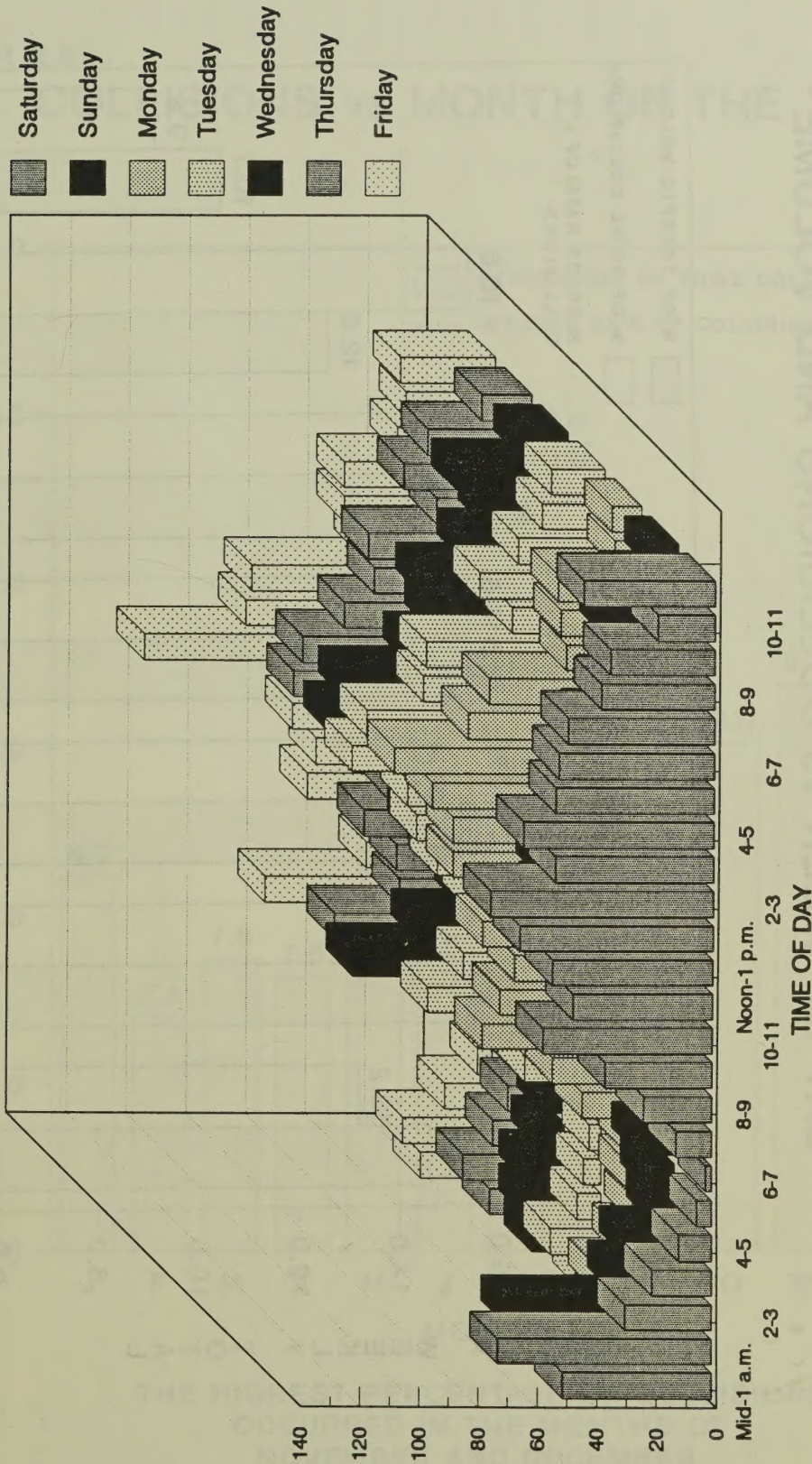
COLLISIONS OCCURRED AT A MUCH HIGHER THAN EXPECTED RATE (RELATIVE TO TRAFFIC VOLUME) BETWEEN MIDNIGHT AND 5 A.M DAILY



Exhibit 2.3

COLLISION OCCURENCES BY TIME OF DAY AND DAY OF WEEK

NUMBER OF COLLISIONS IN EACH HOUR

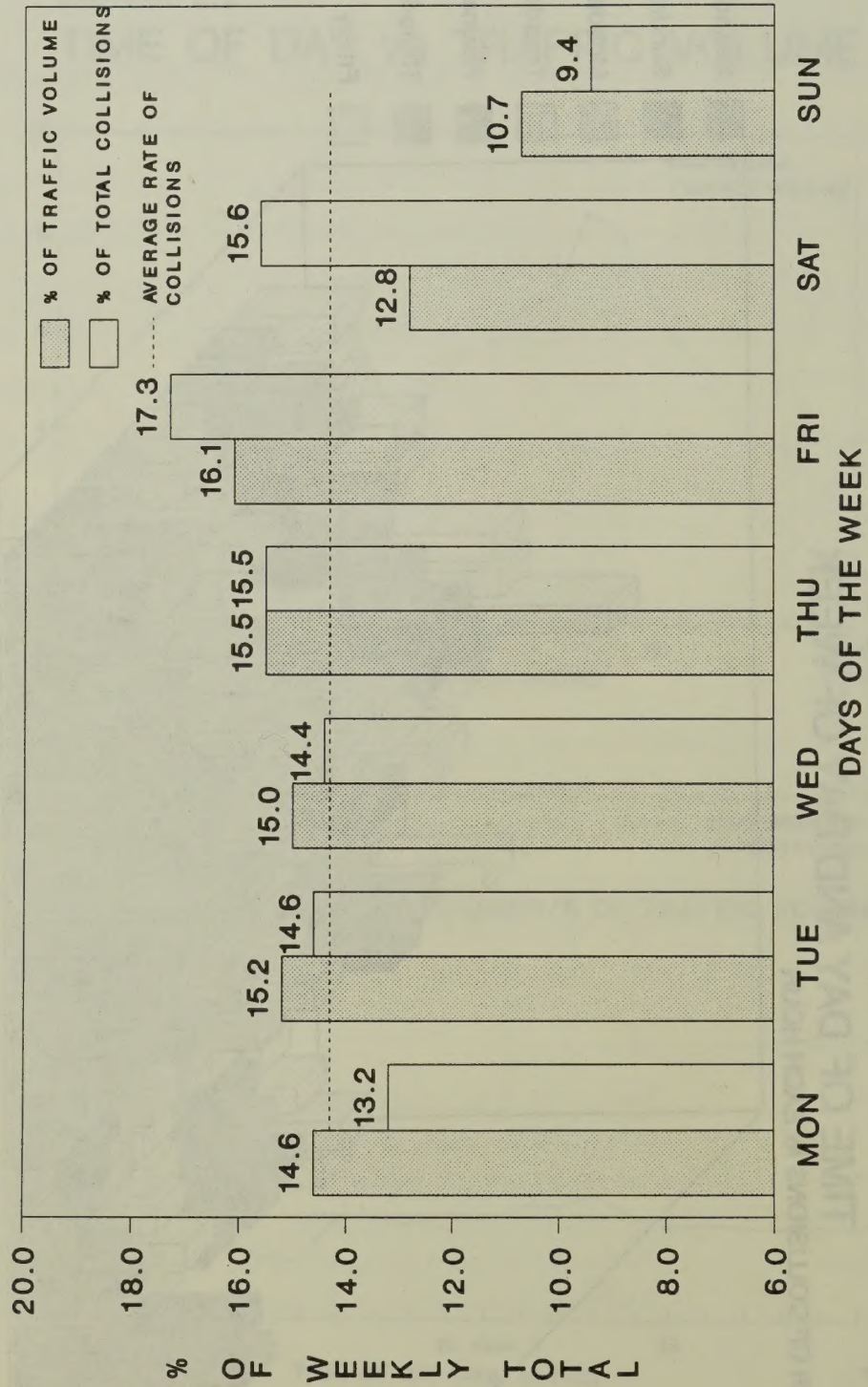


COLLISIONS WERE MOST LIKELY TO OCCUR
BETWEEN 3 p.m. and 5 p.m. on FRIDAYS



Exhibit 2.4

DAY OF WEEK vs COLLISIONS AND VOLUME

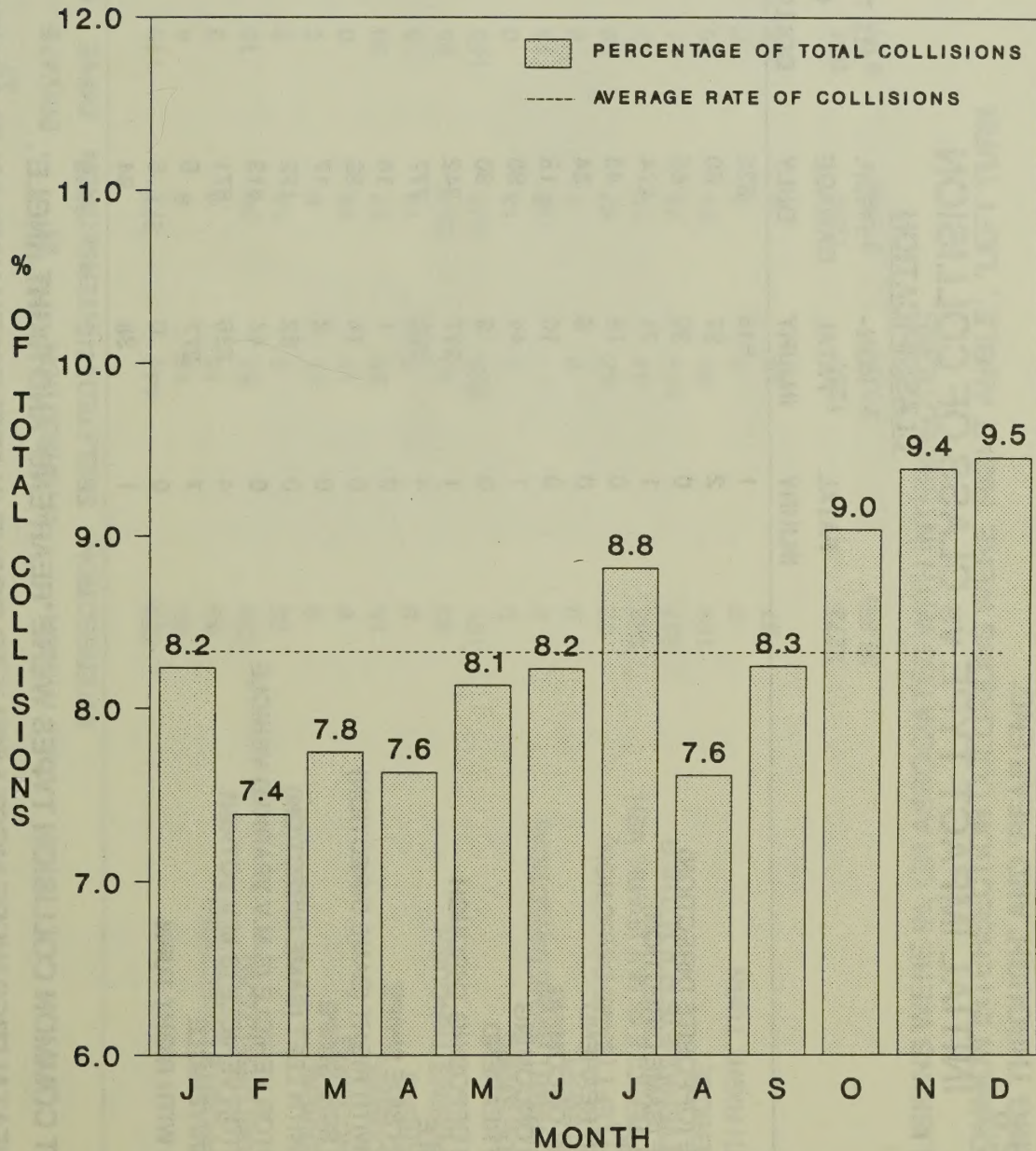


FRIDAYS AND SATURDAYS HAD MORE COLLISIONS THAN EXPECTED WHEN COMPARED TO TRAFFIC VOLUME. THE HIGHEST NUMBER OF COLLISIONS OCCURRED ON FRIDAYS.



Exhibit 2.5

COLLISIONS vs MONTH OF THE YEAR



THE HIGHEST PERCENTAGE OF COLLISIONS
OCCURRED IN THE MONTHS OF
NOVEMBER AND DECEMBER.



Exhibit 2.6

INITIAL IMPACT TYPE vs CLASS OF COLLISION

INITIAL IMPACT TYPE	CLASSIFICATION				ALL TYPES OF COLLISIONS	% OF TYPE INVOLVING INJURY/ FATALITY
	FATAL INJURY	NON- FATAL INJURY	PROP. DAMAGE ONLY			
REAR END	1	645	823		1469	44.0%
HEAD ON	2	57	60		119	49.6%
SIDE SWIPE (OPPOSITE DIRECTION)	0	30	66		96	31.3%
SIDE SWIPE (SAME DIRECTION)	1	71	274		346	20.8%
OVERTAKING	0	16	43		59	27.1%
RIGHT TURN REAREND	0	8	34		42	19.0%
RIGHT TURN ONCOMING	0	10	18		28	35.7%
LEFT TURN ONCOMING	1	44	90		135	33.3%
LEFT TURN REAREND	0	8	30		38	21.1%
LEFT TURN OPPOSING THROUGH	1	217	342		560	38.9%
RIGHT ANGLE	4	562	777		1343	42.1%
RIGHT TURN SIDE SWIPE	0	1	14		15	6.7%
THROUGH WITH RIGHT (SAME DIRECTION)	0	14	38		52	26.9%
LEFT TURN SIDE SWIPE	0	2	17		19	10.5%
THROUGH WITH LEFT (SAME DIRECTION)	0	32	132		164	19.5%
SINGLE MOTOR VEHICLE (S.M.V.)/PARKED VEHICLE	0	44	413		457	9.6%
SINGLE MOTOR VEHICLE (S.M.V.)/OTHER	4	236	571		811	29.6%
PEDESTRIAN/VEHICLE	7	277	5		289	98.3%
LEFT TURN WITH RIGHT TURN	0	0	5		5	0.0%
OTHER	1	38	94		133	29.3%
TOTAL	22	2312	3846		6180	

THE MOST COMMON COLLISION TYPES WERE 'REAR END' AND 'RIGHT ANGLE'.

INJURIES/FATALITIES WERE MOST LIKELY TO OCCUR IN 'PEDESTRIAN/VEHICLE' & 'HEAD ON' COLLISIONS.

THE HIGHEST NUMBER OF INJURIES WERE IN 'REAR END' AND 'RIGHT ANGLE' COLLISIONS.

(a) The traffic movements causing these collisions are shown diagrammatically on the chart in Appendix A.1.

INITIAL IMPACT TYPE vs ROAD CLASSIFICATION

INITIAL IMPACT TYPE	ROAD LOCATION					AT	
	NON- INTERSECTION	INTERSECTION RELATED	IN INTERSECTION	PRIVATE DRIVE	OTHER (a)	TOTAL	
REAR END	623	444	277	110	15	1469	
HEAD ON	86	19	8	4	2	119	
SIDE SWIPE (OPPOSITE DIRECTION)	69	14	9	3	1	96	
SIDE SWIPE (SAME DIRECTION)	228	64	36	16	2	346	
OVERTAKING	28	8	14	9	0	59	
RIGHT TURN REAREND	6	21	9	6	0	42	
RIGHT TURN ONCOMING	6	10	12	0	0	28	
LEFT TURN ONCOMING	15	25	57	38	0	135	
LEFT TURN REAREND	5	9	19	5	0	38	
LEFT TURN OPPOSING THROUGH	20	99	384	55	2	560	
RIGHT ANGLE	101	236	848	155	3	1343	
RIGHT TURN SIDE SWIPE	0	2	13	0	0	15	
THROUGH WITH RIGHT (SAME DIRECTION)	9	11	18	14	0	52	
LEFT TURN SIDE SWIPE	0	9	8	2	0	19	
THROUGH WITH LEFT (SAME DIRECTION)	32	42	67	22	1	164	
SINGLE MOTOR VEHICLE (S.M.V.)/PARK. VEH.	342	44	12	57	2	457	
SINGLE MOTOR VEHICLE (S.M.V.)/OTHER	537	114	73	41	46	811	
PEDESTRIAN/VEHICLE	109	58	94	20	8	289	
LEFT TURN WITH RIGHT TURN	0	2	3	0	0	5	
OTHER	57	19	8	47	2	133	
TOTAL	2273	1250	1969	604	84	6180	
%	36.8%	20.2%	31.9%	9.8%	1.4%	100.0%	

52% OF COLLISIONS WERE IN, OR ASSOCIATED WITH INTERSECTIONS.

THE MOST COMMON INTERSECTION COLLISIONS WERE 'RIGHT ANGLE', 'LEFT TURN WITH OPPOSING THROUGH' AND 'REAR END'.

THE MOST COMMON NON-INTERSECTION COLLISIONS WERE 'REAR END' AND 'SINGLE MOTOR VEHICLE'.

(a) "OTHER" includes 'at railroad', 'underpass or tunnel', 'overpass or bridge' and 'other'.

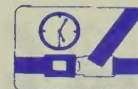




Exhibit 2.8

INITIAL IMPACT TYPE vs TYPE OF TRAFFIC CONTROL

TYPE OF TRAFFIC CONTROL AT LOCATION (a)

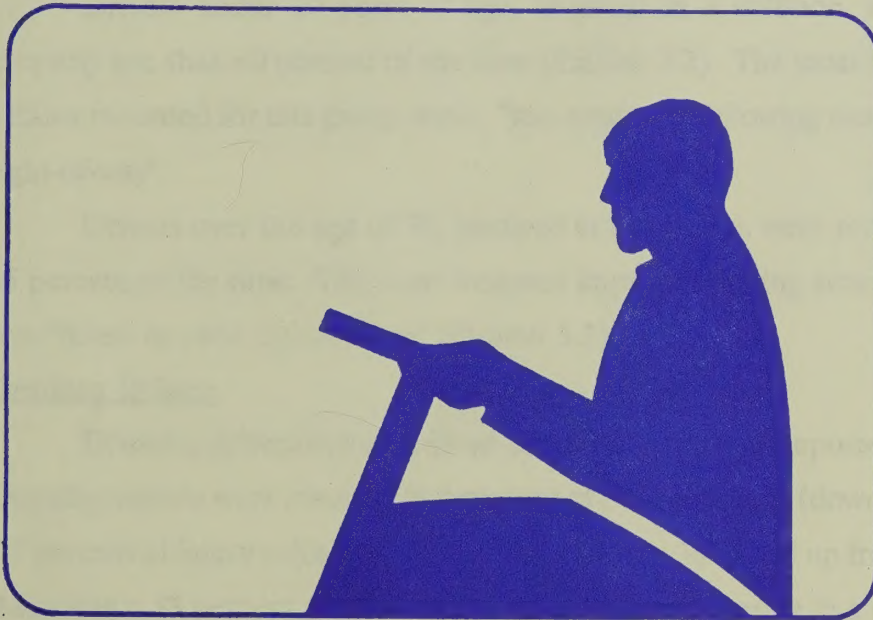
INITIAL IMPACT TYPE	TRAFFIC										TRAFFIC		TOTAL
	SIGNAL	STOP	YIELD	POLICE	SCHOOL	SCHOOL	GUARD	BUS	GATE	PERSON*	CONTROL	TRAFFIC	
REAR END	634	261	25	0	2	1	0	0	0	0	0	545	1 1469
HEAD ON	18	31	0	1	0	0	0	0	0	0	0	68	1 119
SIDE SWIPE (OPPOSITE DIRECTION)	18	15	0	0	0	0	0	0	0	0	0	61	2 96
SIDE SWIPE REAR	115	50	4	0	0	0	0	0	0	1	1	175	1 346
OVERTAKING	19	8	0	0	0	0	0	0	0	0	0	32	0 59
RIGHT TURN REAR END	19	15	1	0	0	0	0	0	0	0	0	7	0 42
RIGHT TURN ONCOMING	8	13	0	0	0	0	0	0	0	0	0	7	0 28
LEFT TURN ONCOMING	24	85	0	0	0	0	0	0	0	0	0	26	0 135
LEFT TURN REAR END	10	16	1	0	1	0	0	0	0	0	0	9	1 38
LEFT TURN OPPOSING THROUGH	379	98	1	0	0	0	0	0	0	0	0	82	0 560
RIGHT ANGLE	489	670	8	1	0	0	0	0	0	0	0	172	3 1343
RIGHT TURN SIDE SWIPE	14	1	0	0	0	0	0	0	0	0	0	0	0 15
THRU. WITH RIGHT (SAME DIRECT'N)	24	8	0	0	0	0	0	0	0	0	0	20	0 52
LEFT TURN SIDE SWIPE	13	4	0	0	0	0	0	0	0	0	0	2	0 19
THRU. WITH LEFT (SAME DIRECT'N)	61	52	0	0	0	0	0	0	0	0	0	51	0 164
S.M.V./PARKED VEHICLE	19	155	2	0	0	0	0	0	0	0	0	280	1 457
S.M.V./OTHER	114	186	3	1	0	1	0	0	0	2	2	496	8 811
PEDESTRIAN/VEHICLE	126	81	0	0	1	0	0	0	0	0	0	80	1 289
LEFT TURN WITH RIGHT TURN	3	2	0	0	0	0	0	0	0	0	0	0	0 5
OTHER	16	38	0	0	0	0	0	0	0	0	0	79	0 133
TOTAL	2123	1789	45	3	4	2	0	0	0	3	0.0%	2192	19 6180
%	34.4%	28.9%	0.7%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	35.5%	0.3% 100.0%

36% OF ALL COLLISIONS OCCURRED AT LOCATIONS WITH NO TRAFFIC CONTROL.

THE MOST COMMON COLLISION TYPE AT A TRAFFIC SIGNAL WAS 'REAR END'.

THE MOST COMMON COLLISION TYPE AT A STOP SIGN WAS 'RIGHT ANGLE'.

(a) Includes all collisions at both intersection and non-intersection locations.



Chapter Three

Drivers



Chapter 3

Driver Age

Although persons under the age of 25 make up only 14.8 percent of the licensed driving population, this age group was represented in 17.4 percent of reported drivers. (Exhibit 3.1).

Drivers under 20 years of age, involved in a collision, were recorded as driving properly less than 40 percent of the time (Exhibit 3.2). The most frequent improper driving actions recorded for this group were: "lost control", "following too close" and "failed to yield right-of-way".

Drivers over the age of 75, involved in a collision, were recorded as driving properly 35 percent of the time. The most frequent improper driving action recorded for this group was "failed to yield right-of-way" (Exhibit 3.2).

Drinking Drivers

Drinking drivers were involved in 6.4 percent of all reported collisions (Exhibit 3.3). Drinking drivers were involved in 0 percent of fatal collisions (down from 16.0% in 1991) and 7.7 percent of injury collisions (down from 11.3% in 1985 and up from 7.4% in 1991). In 1985 there was a 33 percent greater chance of an injury occurring in a collision which involved a driver who had consumed alcohol than in a collision in which all drivers were sober; there was a 7 percent greater chance in 1991, and an 8 percent greater chance in 1992.

Exhibit 3.4 indicates that 80 percent of collisions involving alcohol occurred during the period from 5 p.m. to 3 a.m.

Exhibit 3.5 indicates that less than 18 percent of the drivers involved in collisions who admitted to alcohol consumption but were not legally impaired, were driving properly. Less than 4 percent of drivers who were legally impaired due to alcohol were recorded as driving properly at the time of the collision. The most frequently indicated improper driver action was loss of control of the vehicle.

Drivers between the ages twenty and forty-four had the highest probability of being under the influence of alcohol at the time of a collision (Exhibit 3.6).

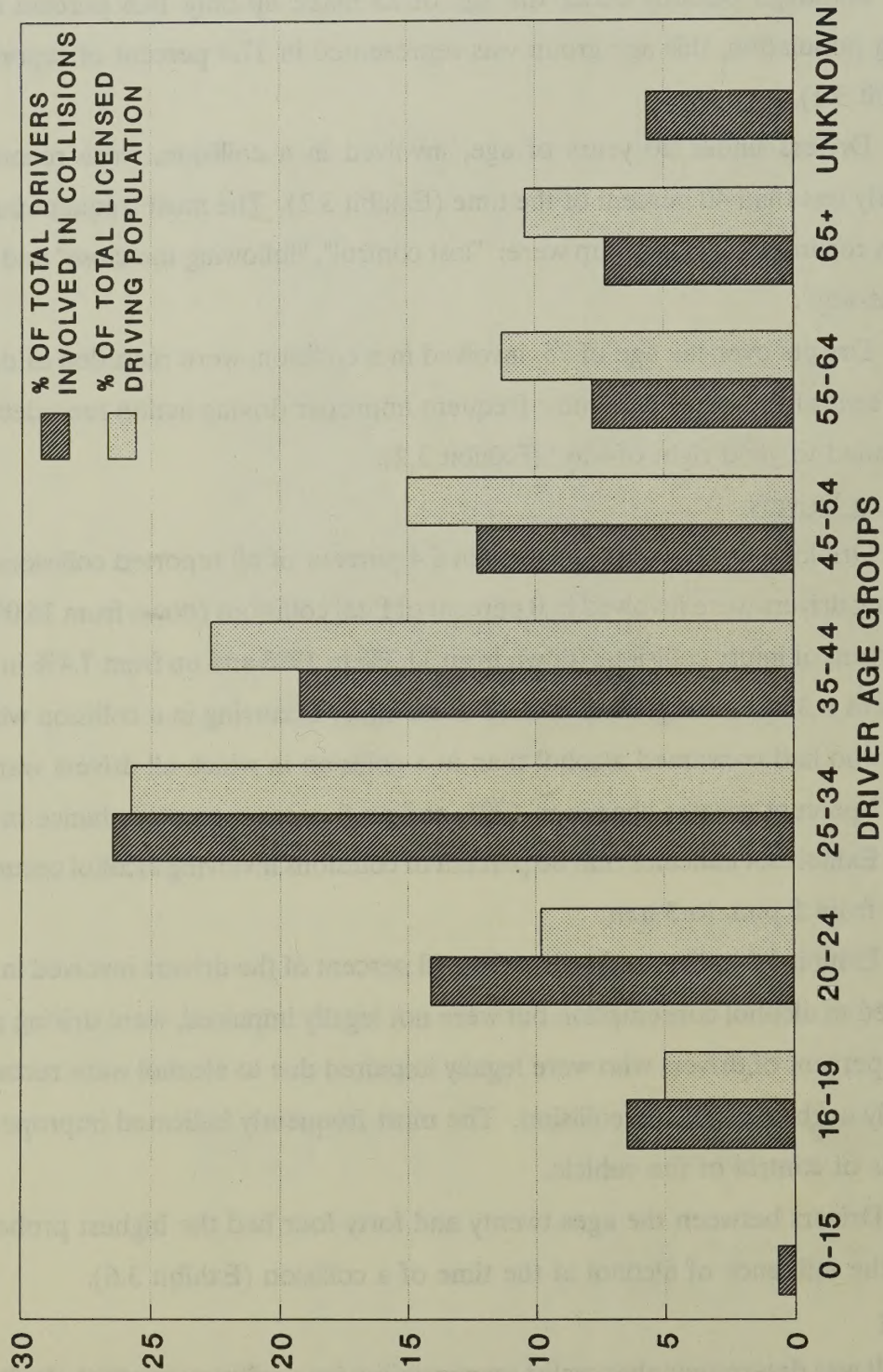
Cyclists

It was determined that cyclist responsibility for a collision in which she/he was involved decreased with increasing cyclist age. 26.5 percent or less of cyclists under 19, involved in collisions, were recorded as driving properly (Exhibit 3.7). The most predominant known cyclist improper action indicated was failure to yield right-of-way.



MOTOR VEHICLE DRIVER AGE VS COLLISION INVOLVEMENT

Exhibit 3.1



DRIVERS UNDER 35 YEARS OF AGE ARE INVOLVED IN MORE COLLISIONS THAN EXPECTED BASED ON THE AGE DISTRIBUTION OF THE LICENSED DRIVING POPULATION OF ONTARIO.



Exhibit 3.2

MOTOR VEHICLE DRIVER AGE vs DRIVER ACTION

DRIVER ACTION	<u>DRIVER AGE</u>										% OF ALL ACTIONS
	0-15	16-19	20-24	25-34	35-44	45-54	55-64	65-74	75+	TOTAL	
DRIVING PROPERLY	10	248	736	1575	1200	748	454	261	80	5312	49.6%
FOLLOWING TOO CLOSE	1	82	174	307	205	107	72	38	16	1002	9.3%
EXCEEDING SPEED LIMIT	0	11	11	10	8	4	3	3	0	50	0.5%
SPEED TOO FAST	0	22	41	51	36	17	6	4	1	178	1.7%
SPEED TOO SLOW	0	0	1	0	0	0	0	0	0	1	0.01%
IMPROPER TURN	3	41	76	119	122	87	60	53	29	590	5.5%
DISOBEYED TRAFFIC CONTROL	15	43	89	158	101	69	51	36	19	581	5.4%
FAILED TO YIELD R.O.W.	25	96	167	268	182	149	110	97	65	1159	10.8%
IMPROPER PASSING	0	3	11	19	11	4	6	3	0	57	0.5%
LOST CONTROL	10	110	153	233	129	81	39	27	16	798	7.4%
WRONG WAY ON ONE-WAY	3	10	5	9	5	4	1	3	1	41	0.4%
IMPROPER LANE CHANGE	1	14	40	67	49	39	26	22	7	265	2.5%
OTHER	7	57	100	195	137	87	56	35	10	684	6.4%
TOTAL	75	737	1604	3011	2185	1396	884	582	244	10718	100.0%
% DRIVERS INVOLVED	14.7%	36.5%	48.9%	55.9%	58.6%	57.1%	54.8%	47.7%	****	52.9%	
DRIVING PROPERLY (a)											

THE OVERALL PERCENTAGE OF DRIVERS DRIVING PROPERLY WAS 53%.

YOUNGER AND OLDER DRIVERS WERE LEAST LIKELY TO BE DRIVING PROPERLY.

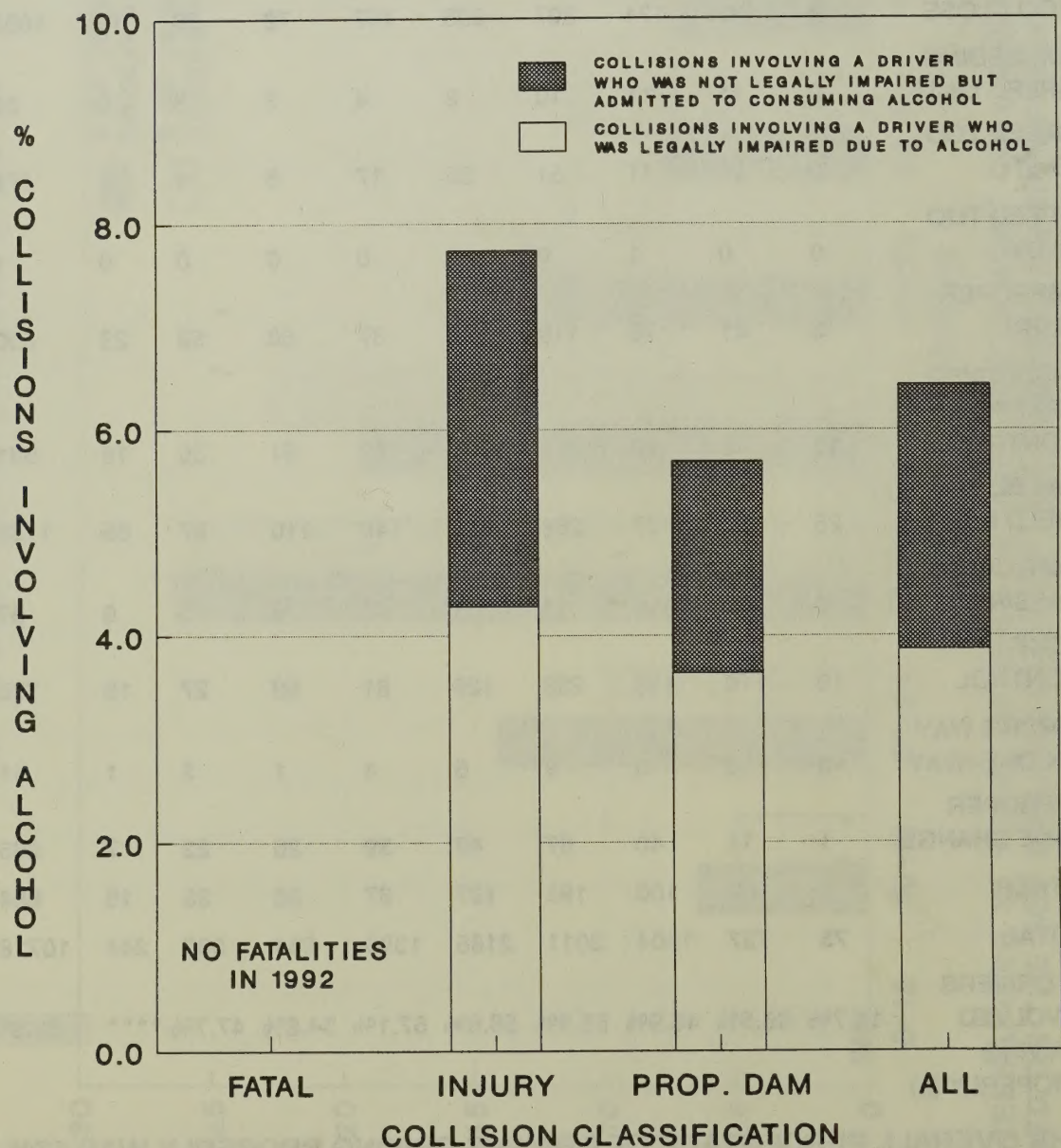
THE MOST FREQUENTLY RECORDED IMPROPER DRIVING ACTION WAS FAILING TO YIELD RIGHT-OF-WAY.

(a) Excluding "Other".



Exhibit 3.3

ALCOHOL INVOLVEMENT vs COLLISION CLASSIFICATION



6.4% OF ALL COLLISIONS INVOLVED A
DRIVER WHO HAD CONSUMED ALCOHOL.



Exhibit 3.4

COLLISIONS INVOLVING ALCOHOL vs TIME OF DAY AND DAY OF WEEK

TIME OF DAY	DAY OF WEEK							TOTAL
	MON	TUES	WED	THUR	FRI	SAT	SUN	
12-1 a.m.	3	0	3	2	10	14	10	42
1-2 a.m.	5	2	2	7	7	17	22	62
2-3 a.m.	1	3	2	5	10	9	5	35
3-4 a.m.	0	0	2	4	0	5	7	18
4-5 a.m.	0	1	0	1	0	3	7	12
5-6 a.m.	0	0	2	0	0	1	1	4
6-7 a.m.	0	0	1	0	0	1	1	3
7-8 a.m.	0	0	0	1	0	1	0	2
8-9 a.m.	0	0	0	0	0	1	0	1
9-10 a.m.	0	0	0	0	0	1	0	1
10-11 a.m.	0	0	0	1	0	1	1	3
11-12 noon	0	0	0	0	0	1	0	1
12-1 p.m.	0	0	0	0	0	3	1	4
1-2 p.m.	0	1	1	0	1	0	0	3
2-3 p.m.	1	1	1	0	1	3	1	8
3-4 p.m.	0	1	0	3	1	5	1	11
4-5 p.m.	0	2	1	2	1	1	2	9
5-6 p.m.	2	4	1	2	8	4	1	22
6-7 p.m.	2	1	0	3	4	7	3	20
7-8 p.m.	1	1	0	3	6	7	4	22
8-9 p.m.	3	5	4	7	9	7	4	39
9-10 p.m.	1	1	4	8	4	3	4	25
10-11 p.m.	1	4	5	3	3	4	0	20
11-12 midnight	0	2	2	3	11	10	3	31
UNKNOWN	0	0	0	0	0	0	0	0
TOTAL	20	29	31	55	76	109	78	398

**MOST COLLISIONS INVOLVING ALCOHOL OCCURRED IN THE EVENING
FROM 5 p.m. TO 3 a.m.**



Exhibit 3.5

DRIVER ACTION vs

DRIVER ACTION	DRIVER CONDITION				
	NORMAL	HAD BEEN DRINKING (a)	IMPAIRED- ALCOHOL OVER .08 (b)	IMPAIRED- ALCOHOL (c)	IMPAIRED- DRUGS (d)
DRIVING PROPERLY	5170	25	5	1	1
FOLLOWING TOO CLOSE	861	10	8	5	0
EXCEEDING SPEED LIMIT	30	7	7	1	0
SPEED TOO FAST	132	10	4	3	0
SPEED TOO SLOW	0	1	0	0	0
IMPROPER TURN	537	3	5	1	0
DISOBEYED TRAFFIC CONTROL	479	8	15	7	0
FAILED TO YIELD R.O.W.	1016	20	10	6	0
IMPROPER PASSING	49	1	4	0	0
LOST CONTROL	518	54	85	20	0
WRONG WAY ON ONE-WAY	35	2	1	0	0
IMPROPER LANE CHANGE	232	3	4	1	0
OTHER	506	25	34	13	0
TOTAL	9565	169	182	58	1
% DRIVERS INVOLVED DRIVING PROPERLY (e)	57.1%	17.4%	3.4%	2.2%	100.0%

LESS THAN 18% OF DRIVERS WHO HAD BEEN DRINKING AND LESS THAN 4% OF DRIVERS WHO WERE IMPAIRED DUE TO ALCOHOL WERE RECORDED AS DRIVING PROPERLY AT THE TIME OF THE COLLISION.

- (a) Driver had consumed alcohol but their physical condition was not legally impaired.
 (b) Driver had consumed alcohol and upon testing was found to have a blood-alcohol level in excess of 80 mg.



DRIVER CONDITION

MEDICAL					TOTAL	%
FATIGUE	DISABILITY	INATTENTIVE	UNKNOWN	OTHER		
0	1	6	136	0	5345	48.13%
0	0	56	89	1	1030	9.28%
0	0	1	10	1	57	0.51%
0	1	11	24	1	186	1.67%
0	0	0	0	0	1	0.01%
0	1	17	53	0	617	5.56%
0	1	40	64	2	616	5.55%
1	5	50	93	2	1203	10.83%
0	0	3	7	0	64	0.58%
6	11	21	169	3	887	7.99%
0	0	0	7	0	45	0.41%
0	1	13	28	0	282	2.54%
3	2	26	159	4	772	6.95%
10	23	244	839	14	11105	100.00%
0.0%	4.8%	2.8%	20.0%	0.0%	51.7%	

- (c) Driver had consumed sufficient alcohol to warrant being charged with a drinking and driving offence in the judgement of the investigating officer.
- (d) Driver had used drugs and was legally impaired in the judgement of the investigating officer.
- (e) Excluding not known and other.



Exhibit 3.6

DRIVER AGE vs DRIVER CONDITION

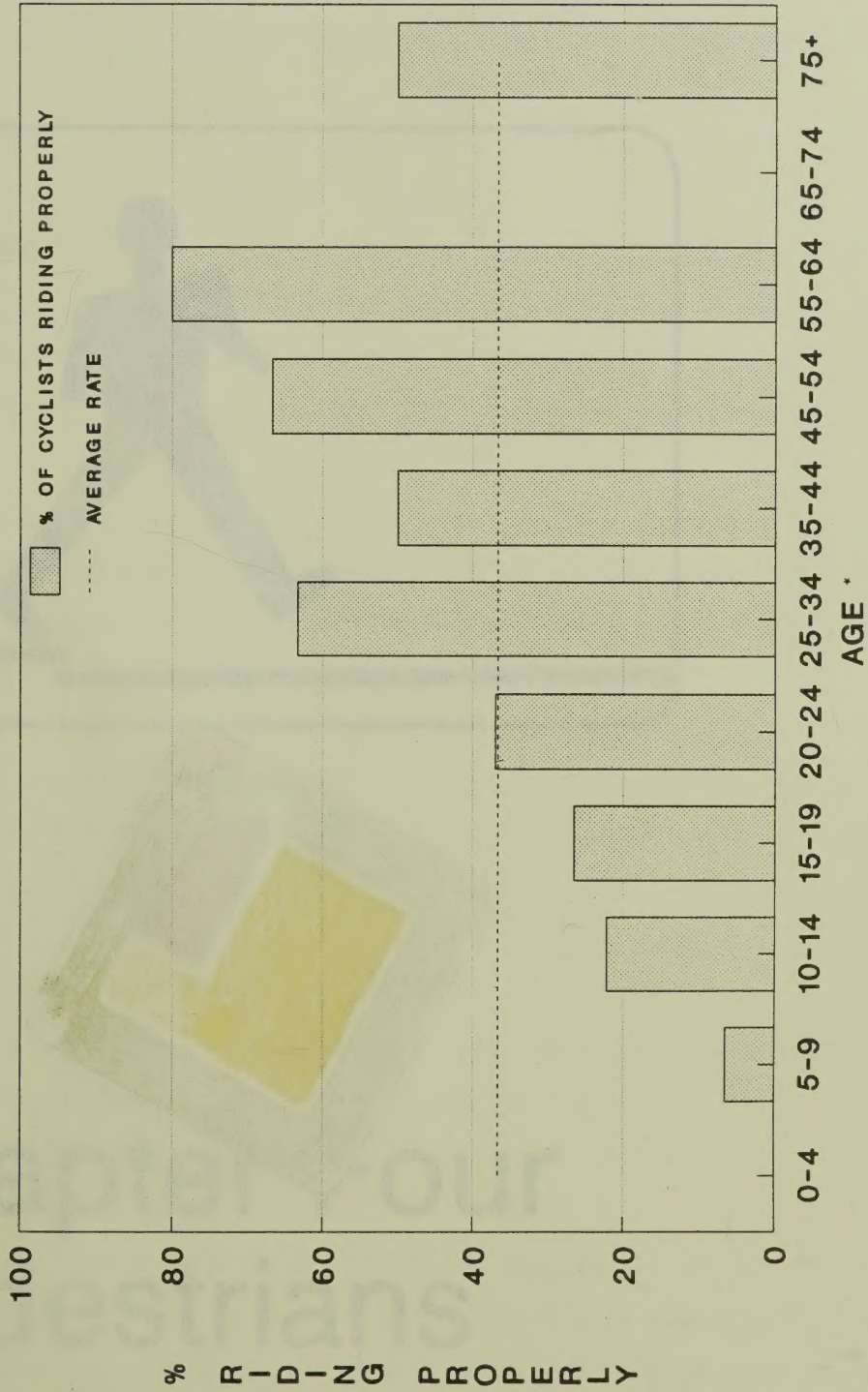
DRIVER CONDITION	DRIVER AGE										NO DRIVER	UNKNOWN	TOTAL	%
	0-15	16-19	20-24	25-34	35-44	45-54	55-64	65-74	75+					
NORMAL	58	661	1420	2638	1952	1242	793	521	212	1	67	9565	86.0%	
HAD BEEN DRINKING	0	9	40	57	29	14	12	1	1	0	7	170	1.5%	
IMPAIRED- ALCOHOL OVER .08	0	3	17	69	56	28	5	4	0	0	0	182	1.6%	
IMPAIRED- ALCOHOL	0	1	10	22	6	9	5	1	0	0	4	58	0.5%	
IMPAIRED- DRUGS	0	0	0	0	0	0	0	1	0	0	0	1	0.0%	
FATIGUE	0	0	2	5	1	1	0	1	0	0	0	10	0.1%	
MEDICAL DISABILITY	0	0	0	2	8	3	2	4	4	0	0	23	0.2%	
INATTENTIVE	5	19	28	50	49	32	23	18	16	0	4	244	2.2%	
NOT KNOWN	11	42	84	165	83	67	43	30	11	0	324	860	7.7%	
OTHER	1	2	4	2	1	1	1	0	0	0	2	14	0.1%	
TOTAL	75	737	1605	3010	2185	1397	884	581	244	1	408	11127	100.0%	
% DRINKING DRIVERS INVOLVED (a)	0.0%	1.9%	4.4%	5.2%	4.3%	3.8%	2.6%	1.1%	0.4%	0.0%	13.4%			

DRIVERS IN THE AGE GROUP 20 TO 44 WERE MOST LIKELY TO HAVE CONSUMED ALCOHOL BEFORE BEING INVOLVED IN A COLLISION.

(a) Excluding not known and other.



Exhibit 3.7 CYCLIST ACTIONS IN MOTOR VEHICLE COLLISIONS: PERCENTAGE RIDING PROPERLY VS AGE GROUP



THE 5 TO 9 YEAR OLD AGE GROUP HAD THE
POOREST RIDING PERFORMANCE.

•No cyclists were recorded in the 0-4 & 65-74 age groups. Very few involved cyclists over age of 44.



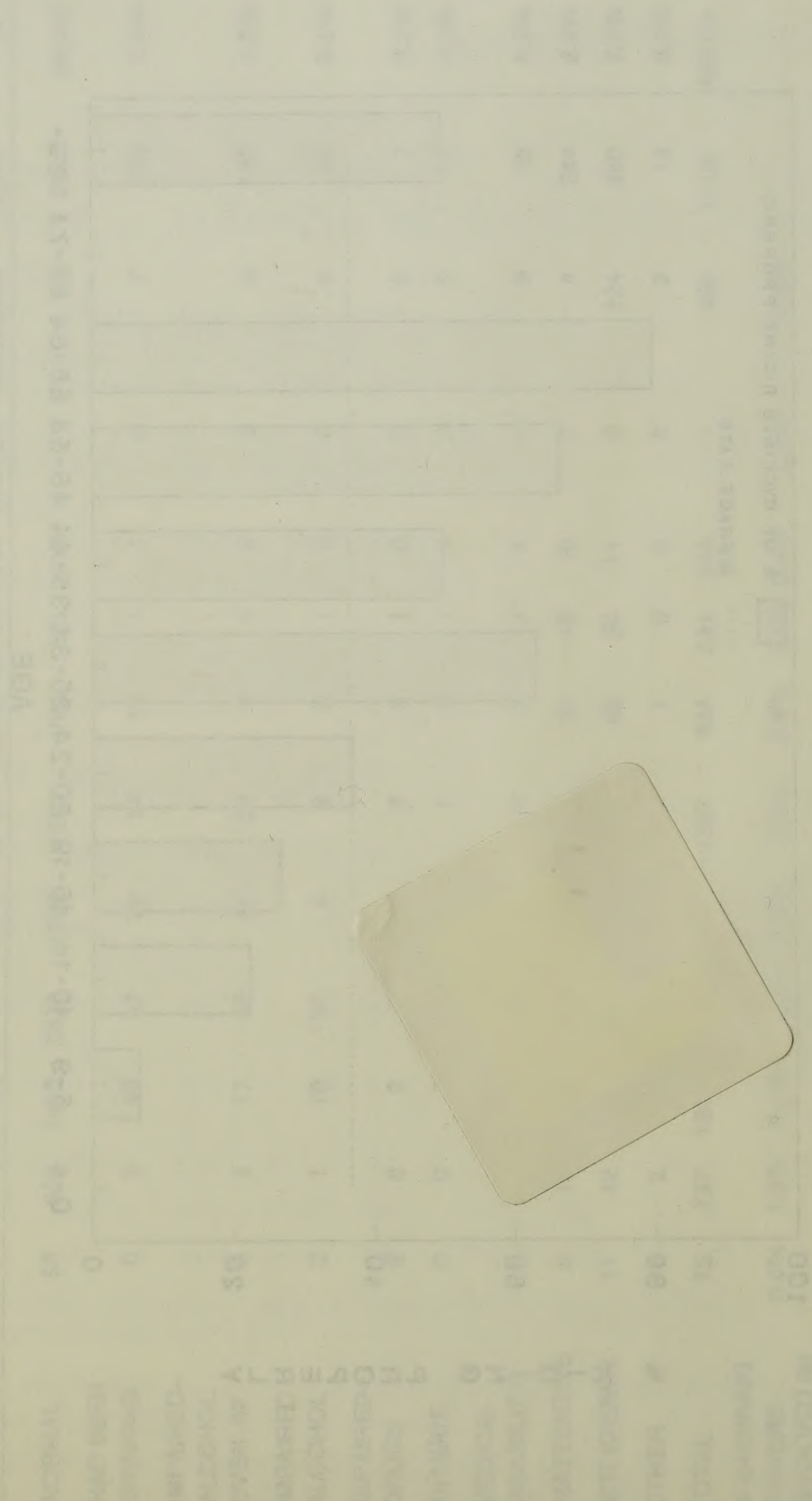
Exhibit 3.6

DRIVER AGE VS DRIVER CONDITION

Age groups with highest number of drivers in poor condition are 15-19 and 20-24. The highest number of drivers in good condition are 25-29 and 30-34.

Source: Hamilton-Wentworth Collision Report, 1992

DRIVER CONDITION: 0-15, 16-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, 90-94, 95-99, 100-104



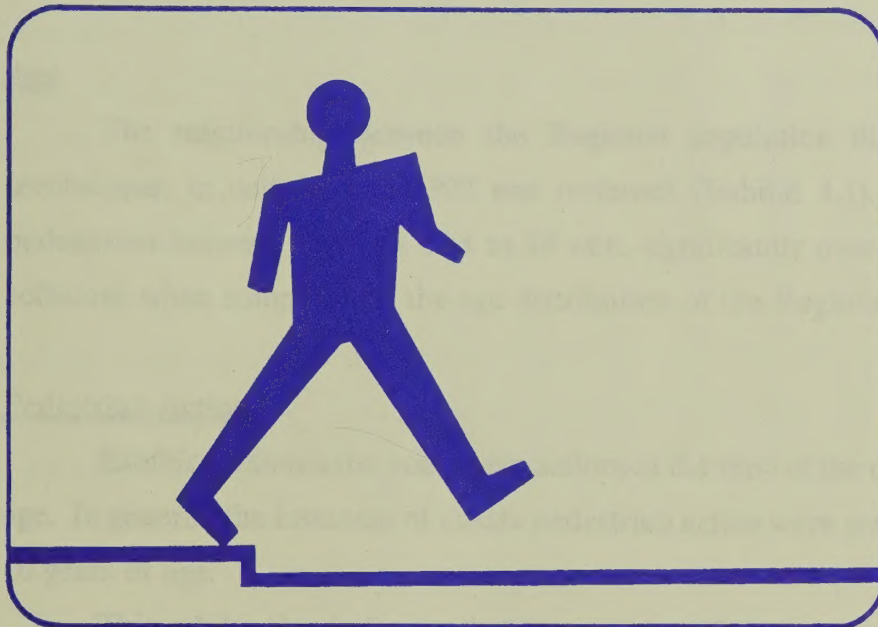
Source: Hamilton-Wentworth Collision Report, 1992



Chapter 4

General

In 1982, there were 10,000 pedestrian deaths (Table 4.1) resulting in 20 pedestrian injuries and 9 pedestrian deaths. 100 pedestrians were injured and 100 were killed.



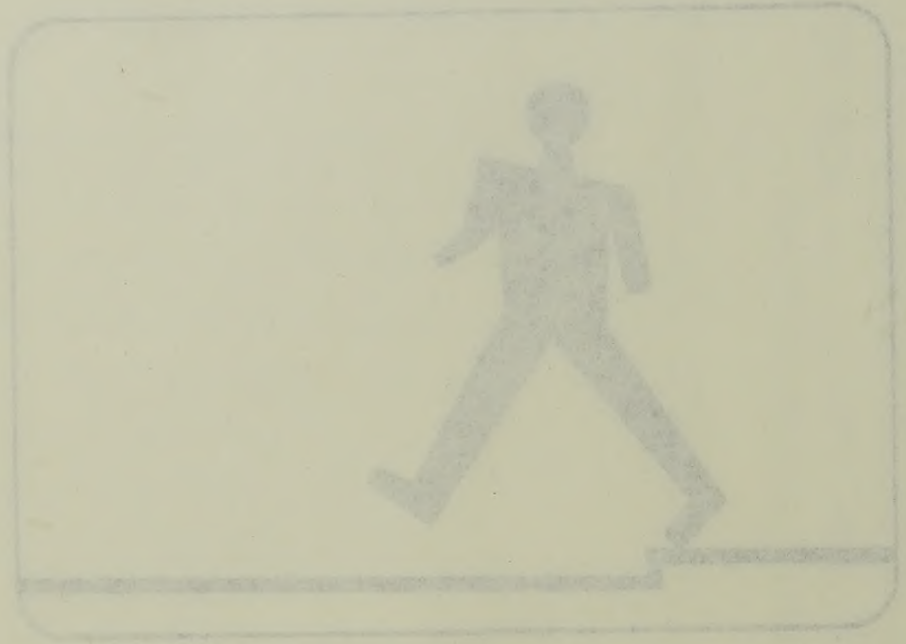
Unexpectedly, during the 1980s, the number of pedestrian deaths decreased by 50%. In 1992, there were 5,000 pedestrian deaths (Table 4.2) resulting in 10,000 pedestrian injuries and 5,000 pedestrian deaths.

All persons of all ages were involved in 100% of the pedestrian deaths. In 1982, 100% of the pedestrian deaths were caused by a motor vehicle.

Examination of the data indicates that 100% of the pedestrian deaths were caused by a motor vehicle. In 1982, 100% of the pedestrian deaths were caused by a motor vehicle.

Chapter Four Pedestrians

The time of day when the pedestrian deaths occurred was 100% of the pedestrian deaths. In 1982, 100% of the pedestrian deaths were caused by a motor vehicle. In 1992, 100% of the pedestrian deaths were caused by a motor vehicle.



Chapter Four Pedestrians



Chapter 4

General

In 1992, there were 300 pedestrian collisions (Exhibit 1.6) resulting in 297 pedestrian injuries and 9 pedestrians fatalities (12 pedestrians were involved in a collision but were not hurt).

Age

The relationship between the Regional population distribution and pedestrian involvement in collisions in 1992 was reviewed (Exhibit 4.1). It was determined that pedestrians between the ages of 5 to 19 were significantly over-represented in pedestrian collisions when compared to the age distribution of the Regional population.

Pedestrian Action

Exhibit 4.2 shows the pedestrian actions at the time of the collisions versus pedestrian age. In general, the instances of unsafe pedestrian action were greater for pedestrians under 10 years of age.

This exhibit also indicates that the actions of "coming from behind a parked car" or "unexpectedly running into the roadway" accounted for 24.2 percent of pedestrian actions at the time of the collision. These unsafe actions are particularly associated with pedestrians under 15 years of age.

44 percent of all pedestrian collisions indicate that the pedestrian was involved in an unsafe action (e.g. coming from behind a parked vehicle).

Examination of the data for pedestrian collisions at traffic signals indicates that in 78% of cases, the pedestrian was not at fault (Exhibit 4.3).

Time of Collisions

The time of day when collisions occurred was compared to the number of pedestrians injured (Exhibit 4.4). It was determined that 13.2 percent of pedestrians were injured in collisions which occurred between 3 p.m. and 4 p.m. Exhibit 4.5 compares the time of day of pedestrian collisions with pedestrian age. 50 pedestrians between the ages 5 to 19 were involved in pedestrian collisions which occurred at school crossing times.* This represents 15.7 percent of the 318 pedestrians involved in collisions in 1992.



- * School crossing times: 8:00 a.m. - 9:15 a.m., 11:30 a.m. - 1:45 p.m.
3:30 p.m. - 4:45 p.m., Monday - Friday; excluding June, July and August.

Pedestrian Condition

In most cases, the condition of the pedestrian (Exhibit 4.6) involved in the collision was reported as normal (65% of the time). However, in 8.5 percent of the collisions involving pedestrians, the pedestrian admitted to alcohol consumption or was legally impaired.

Location

Exhibit 4.7 examines the type of traffic control at locations where pedestrian collisions occurred. In 47 percent of the pedestrian collisions, the collision occurred at a non-intersection location with no control, 31% at a traffic signal controlled intersection, and 16 percent at a stop sign controlled intersection.

Driver Action

Exhibit 4.8 indicates that in 62 percent of the motor vehicle/pedestrian collisions, the driver was recorded as driving properly. This figure does not necessarily suggest that the drivers involved in these collisions were totally without blame but does indicate that a majority of pedestrian collisions are associated with improper pedestrian action or lack of awareness of traffic conditions at the time of the collision.

Of the 34 percent of motor vehicle/pedestrian collisions in which the driver was not driving properly, the most frequently recorded driver action was "failing to yield the right-of-way" (associated with 17.5% of all motor vehicle - pedestrian collisions).

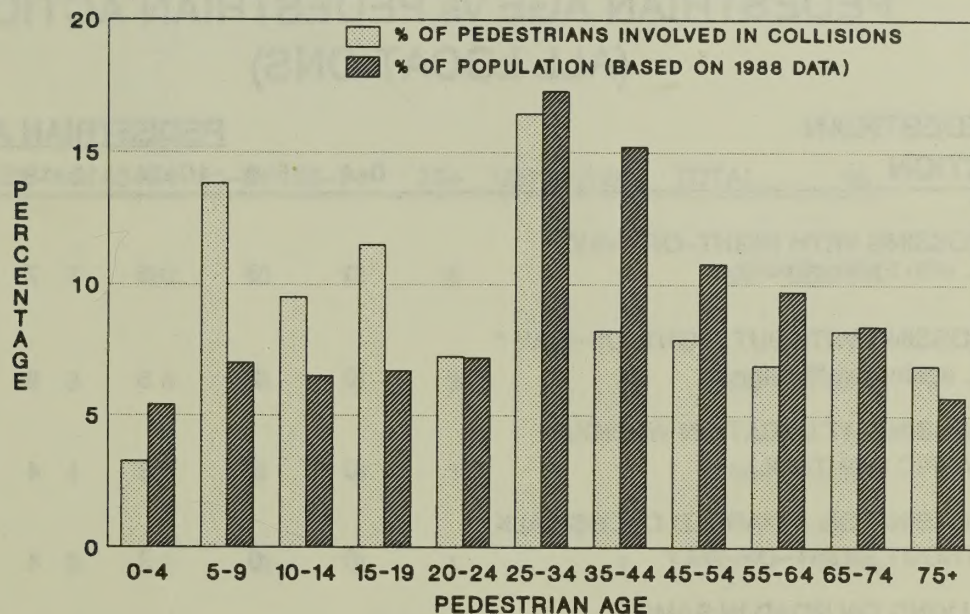
Pedestrian Injuries

Most pedestrians (81.4%) suffered no, minimal or minor injuries when involved in a collision.

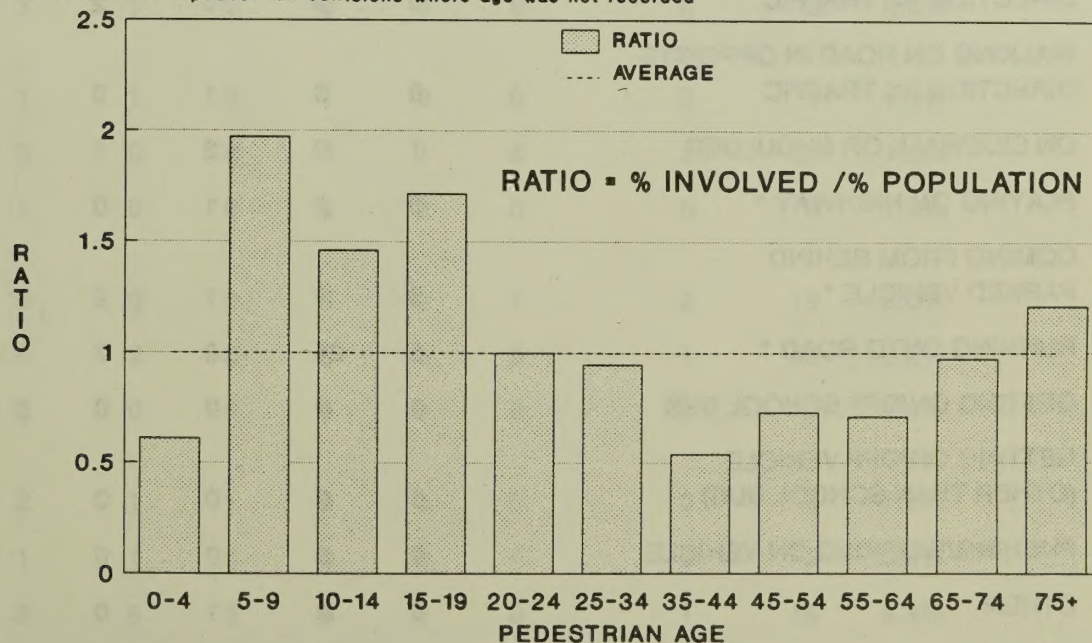


Exhibit 4.1

PEDESTRIAN AGE vs COLLISION INVOLVEMENT



• There were 14 pedestrian collisions where age was not recorded



PEDESTRIANS FROM 5 TO 19 YEARS OLD ARE SIGNIFICANTLY OVER-REPRESENTED IN PEDESTRIAN COLLISIONS BASED ON THE AGE DISTRIBUTION OF POPULATION OF HAMILTON-WENTWORTH.



Exhibit 4.2

**PEDESTRIAN AGE vs PEDESTRIAN ACTION
(ALL LOCATIONS)**

PEDESTRIAN ACTION	PEDESTRIAN AGE				
	0-4	5-9	10-14	15-19	20-24
CROSSING WITH RIGHT-OF-WAY (i.e. with traffic signal)	1	3	5	7	8
CROSSING WITHOUT RIGHT-OF-WAY * (i.e. against traffic signal)	0	2	5	8	2
CROSSING AT LOCATION WITHOUT TRAFFIC CONTROL	0	2	3	4	1
CROSSING ON A MARKED CROSSWALK, WITHOUT RIGHT-OF-WAY	0	0	3	4	0
WALKING ON ROAD IN SAME DIRECTION AS TRAFFIC *	0	0	0	2	2
WALKING ON ROAD IN OPPOSITE DIRECTION AS TRAFFIC	0	0	1	0	0
ON SIDEWALK OR SHOULDER	1	0	2	1	2
PLAYING ON HIGHWAY *	0	2	1	0	0
COMING FROM BEHIND PARKED VEHICLE *	3	8	1	2	2
RUNNING ONTO ROAD *	5	24	8	7	4
GETTING ON/OFF SCHOOL BUS	0	0	0	0	0
GETTING ON/OFF VEHICLE (OTHER THAN SCHOOL BUS)	0	0	0	0	0
PUSHING/WORKING ON VEHICLE	0	0	0	0	0
OTHER	0	0	1	0	1
TOTAL	10	41	30	35	22
% OF PEDESTRIAN COLLISIONS WHERE PEDESTRIAN IS INVOLVED IN AN UNSAFE ACTION (EXCLUDING OTHER)	80.0%	87.8%	51.7%	54.3%	47.6%

THE INSTANCES OF UNSAFE PEDESTRIAN ACTIONS WERE HIGHEST
FOR THE UNDER 10 AGE GROUP.

* Actions considered unsafe



25-34	35-44	45-54	55-64	65-74	75+	UNKNOWN	TOTAL	%
20	7	10	10	12	5	3	91	28.6%
6	3	5	6	3	9	3	52	16.4%
3	4	0	1	6	1	1	26	8.2%
1	0	0	0	3	1	1	13	4.1%
3	1	0	0	0	0	0	8	2.5%
1	1	0	1	0	0	0	4	1.3%
5	0	2	3	1	4	2	23	7.2%
1	0	0	0	0	0	0	4	1.3%
0	0	0	0	0	1	2	19	6.0%
4	2	3	0	0	0	1	58	18.2%
0	0	0	0	0	0	0	0	0.0%
2	1	1	0	0	0	0	4	1.3%
1	1	0	0	0	0	0	2	0.6%
3	5	3	0	0	0	1	14	4.4%
50	25	24	21	25	21	14	318	100.0%
29.8%	30.0%	38.1%	28.6%	12.0%	47.6%	46.2%	46.4%	

24% OF PEDESTRIANS INVOLVED IN COLLISIONS ENTER THE ROADWAY UNEXPECTEDLY (CAME FROM BEHIND PARKED CARS OR RAN INTO THE ROADWAY).



Exhibit 4.3

PEDESTRIAN AGE vs PEDESTRIAN ACTION (AT TRAFFIC SIGNALS)

PEDESTRIAN ACTION	PEDESTRIAN AGE					
	0-4	5-9	10-14	15-19	20-24	25-34
CROSSING WITH RIGHT-OF-WAY (i.e. with traffic signal)	1	1	2	5	6	14
CROSSING WITHOUT RIGHT-OF-WAY * (i.e. against traffic signal)	0	1	1	2	2	2
CROSSING AT LOCATION WITHOUT TRAFFIC CONTROL	0	0	1	0	0	1
CROSSING ON A MARKED CROSSWALK, WITHOUT RIGHT-OF-WAY	0	0	2	4	0	1
WALKING ON ROAD IN THE SAME DIRECTION AS TRAFFIC *	0	0	0	0	0	1
WALKING ON ROAD IN OPPOSITE DIRECTION AS TRAFFIC	0	0	0	0	0	0
ON SIDEWALK OR SHOULDER	0	0	0	0	0	1
PLAYING ON HIGHWAY *	0	0	0	0	0	0
COMING FROM BEHIND PARKED VEHICLE *	0	0	0	0	0	0
RUNNING ONTO ROAD *	0	2	1	1	0	0
GETTING ON/OFF VEHICLE (OTHER THAN SCHOOL BUS)	0	0	0	0	0	0
PUSHING/WORKING ON VEHICLE	0	0	0	0	0	0
OTHER	0	0	0	0	0	1
TOTAL	1	4	7	12	8	21
% OF PEDESTRIAN COLLISIONS WHERE PEDESTRIAN IS INVOLVED IN AN UNSAFE ACTION (EXCLUDING OTHER)	0.0%	75.0%	28.6%	25.0%	25.0%	14.3%

PEDESTRIANS BETWEEN THE AGES OF 5 & 9 WERE MORE LIKELY
THAN OTHER AGE GROUPS TO BE INVOLVED IN COLLISIONS
WHICH OCCURRED AT TRAFFIC SIGNALS DUE TO UNSAFE ACTIONS.

* Actions considered unsafe

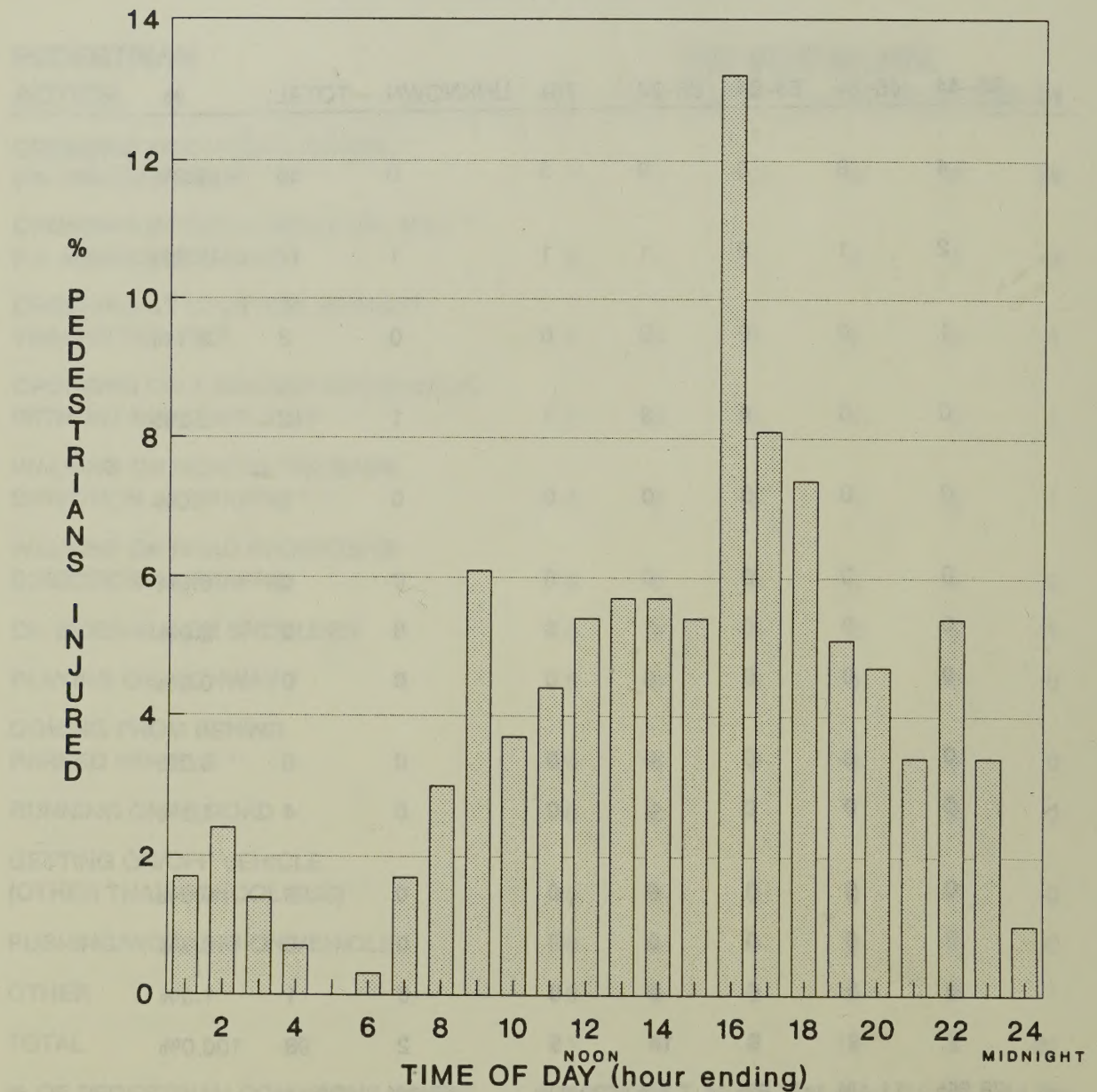


	35-44	45-54	55-64	65-74	75+	UNKNOWN	TOTAL	%
	4	8	5	9	3	0	58	59.2%
	2	1	3	1	1	1	17	17.3%
	1	0	0	0	0	0	3	3.1%
	0	0	0	3	1	1	12	12.2%
	0	0	0	0	0	0	1	1.0%
	0	0	0	0	0	0	0	0.0%
	0	0	0	1	0	0	2	2.0%
	0	0	0	0	0	0	0	0.0%
	0	0	0	0	0	0	0	0.0%
	0	0	0	0	0	0	4	4.1%
	0	0	0	0	0	0	0	0.0%
	0	0	0	0	0	0	0	0.0%
	0	0	0	0	0	0	1	1.0%
	7	9	8	14	5	2	98	100.0%
	28.6%	11.1%	37.5%	7.1%	20.0%	50.0%	22.4%	



Exhibit 4.4

TIME OF DAY vs NUMBER OF PEDESTRIANS INJURED



THE HIGHEST NUMBER OF PEDESTRIAN
COLLISIONS OCCURRED BETWEEN THE HOURS OF
3 p.m. - 4 p.m.



Exhibit 4.5

TIME OF DAY vs PEDESTRIAN AGE

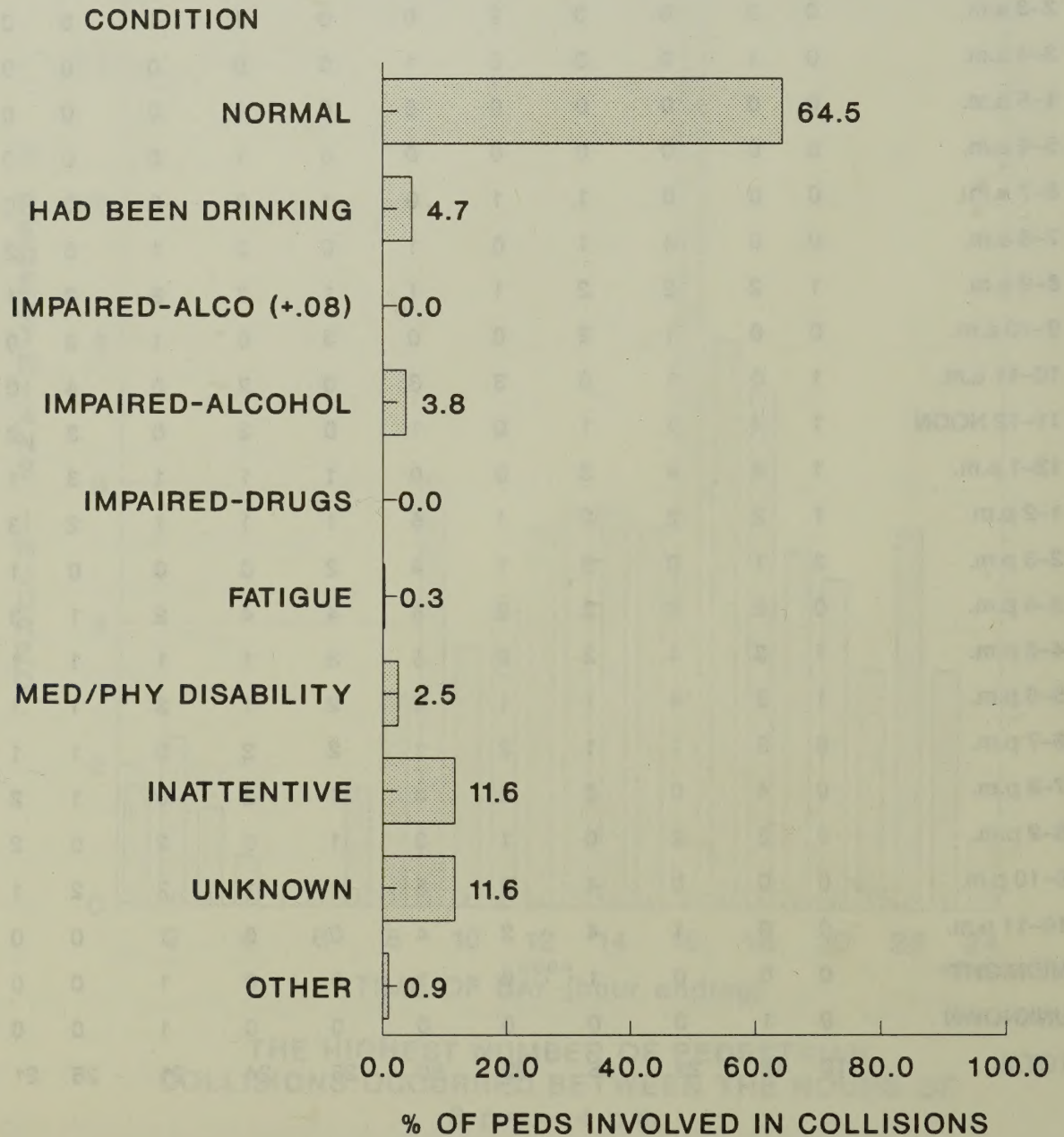
PEDESTRIAN AGE

TIME OF DAY	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65-74	75+	U/K	TOTAL
12-1 a.m.	0	0	0	0	1	3	1	0	0	0	0	0	5
1-2 a.m.	0	0	0	1	2	2	1	0	0	0	0	2	6
2-3 a.m.	0	0	0	0	2	0	0	1	1	0	0	0	4
3-4 a.m.	0	1	0	0	0	1	0	0	0	0	0	0	2
4-5 a.m.	0	0	0	0	0	0	0	0	0	0	0	0	0
5-6 a.m.	0	0	0	0	0	0	0	1	0	0	0	0	1
6-7 a.m.	0	0	0	1	1	0	1	2	0	0	0	0	5
7-8 a.m.	0	0	4	1	0	1	0	0	1	0	2	0	9
8-9 a.m.	1	2	2	2	1	1	1	2	3	3	1	0	19
9-10 a.m.	0	0	1	2	0	0	3	0	1	3	0	2	10
10-11 a.m.	1	0	1	0	3	3	0	2	0	4	0	0	14
11-12 NOON	1	4	1	1	0	1	0	3	0	3	2	0	16
12-1 p.m.	1	4	4	3	0	0	1	1	1	3	1	0	19
1-2 p.m.	1	2	2	2	1	5	1	1	1	2	3	0	21
2-3 p.m.	3	1	0	3	1	4	2	0	0	0	1	2	15
3-4 p.m.	0	12	2	3	2	5	4	4	2	1	3	4	38
4-5 p.m.	1	3	4	3	2	5	3	1	1	1	1	0	25
5-6 p.m.	1	3	4	1	1	2	2	1	3	1	1	2	20
6-7 p.m.	0	3	1	1	2	1	2	2	0	1	1	1	14
7-8 p.m.	0	4	0	2	0	3	1	2	0	1	2	0	15
8-9 p.m.	0	2	2	0	1	3	1	0	2	0	2	1	13
9-10 p.m.	0	0	0	4	0	5	1	1	2	2	1	0	16
10-11 p.m.	0	0	1	4	2	4	0	0	1	0	0	0	12
MIDNIGHT	0	0	0	1	0	1	0	0	1	0	0	0	3
UNKNOWN	0	1	0	0	0	0	0	0	1	0	0	0	2
TOTAL	10	42	29	35	22	50	25	24	21	25	21	14	318

20% OF PEDESTRIANS WERE INVOLVED IN COLLISIONS THAT
OCCURRED BETWEEN THE HOURS OF 3 p.m. – 5 p.m.



Exhibit 4.6 **CONDITION OF PEDESTRIANS INVOLVED IN COLLISIONS**

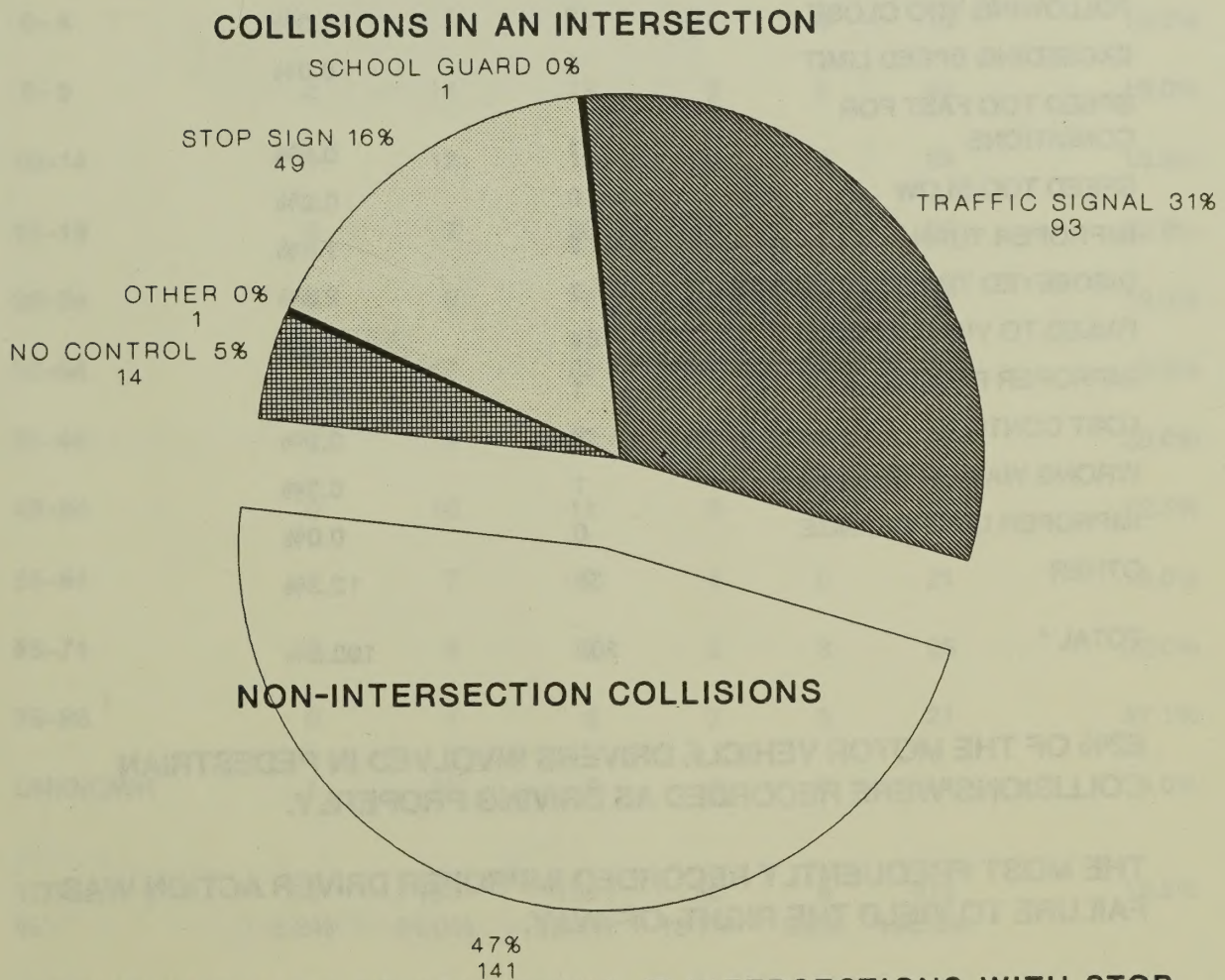


8.5% OF PEDESTRIANS INVOLVED IN COLLISIONS HAD CONSUMED ALCOHOL.



Exhibit 4.7

TYPE OF TRAFFIC CONTROL AT LOCATIONS WHERE PEDESTRIAN COLLISIONS OCCURRED



ABOUT ONE HALF OF COLLISIONS AT INTERSECTIONS WITH STOP SIGNS OCCURRED WHILE PEDESTRIAN WAS CROSSING A LEG OF THE INTERSECTION CONTROLLED BY A STOP SIGN. THUS, ABOUT 39% OF ALL PEDESTRIAN COLLISIONS OCCURED UNDER CONDITIONS WHERE THE PEDESTRIAN SHOULD HAVE HAD RIGHT-OF-WAY.



Exhibit 4.8

DRIVER ACTION IN PEDESTRIAN COLLISIONS

ACTION	NUMBER OF	
	DRIVERS INVOLVED	PERCENTAGE
DRIVING PROPERLY	191	62.0%
FOLLOWING TOO CLOSE	3	1.0%
EXCEEDING SPEED LIMIT	0	0.0%
SPEED TOO FAST FOR CONDITIONS	1	0.3%
SPEED TOO SLOW	0	0.0%
IMPROPER TURN	3	1.0%
DISOBEYED TRAFFIC CONTROL	7	2.3%
FAILED TO YIELD R.O.W.	54	17.5%
IMPROPER PASSING	1	0.3%
LOST CONTROL	9	2.9%
WRONG WAY ON ONE-WAY	1	0.3%
IMPROPER LANE CHANGE	0	0.0%
OTHER	38	12.3%
TOTAL *	308	100.0%

62% OF THE MOTOR VEHICLE DRIVERS INVOLVED IN PEDESTRIAN COLLISIONS WERE RECORDED AS DRIVING PROPERLY.

THE MOST FREQUENTLY RECORDED IMPROPER DRIVER ACTION WAS FAILURE TO YIELD THE RIGHT-OF-WAY.

* Pedestrian collisions involved more than one driver or vehicle in some cases. Data not available on driver action in 7 cases.



Exhibit 4.9

PEDESTRIAN AGE vs INJURY STATUS

PEDESTRIAN AGE	<u>STATUS OF INJURY</u>						% MAJOR OR FATAL INJURY
	NONE	MINIMAL	MINOR	MAJOR	FATAL	TOTAL	
0-4	1	5	3	1	0	10	10.0%
5-9	2	14	18	8	0	42	19.0%
10-14	3	12	11	3	0	29	10.3%
15-19	0	7	20	7	1	35	22.9%
20-24	0	9	10	3	0	22	13.6%
25-34	4	17	25	4	0	50	8.0%
35-44	0	8	12	5	0	25	20.0%
45-54	0	10	11	3	0	24	12.5%
55-64	1	7	9	4	0	21	19.0%
65-74	0	8	9	5	3	25	32.0%
75-98	0	1	8	7	5	21	57.1%
UNKNOWN	1	10	3	0	0	14	0.0%
TOTAL	12	108	139	50	9	318	18.6%
%	3.8%	34.0%	43.7%	15.7%	2.8%	100.0%	

OF ALL PEDESTRIANS INVOLVED IN COLLISIONS, 82%
SUFFERED NO INJURY OR ONLY MINIMAL OR MINOR INJURIES.



1992 Hamilton-Wentworth Collision Report

Exhibit A

PEDESTRIAN AGE vs INJURY STATUS

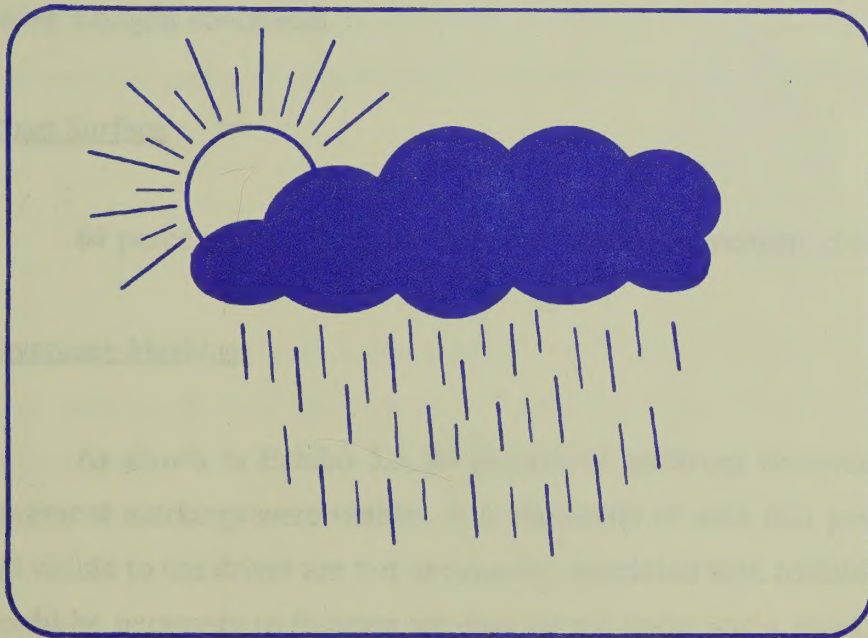
STATUS OF INJURY

AGE	NO. OF INJURIES	NO. OF FATAL INJURIES	NO. OF MAJOR INJURIES	NO. OF MINOR INJURIES	TOTAL INJURIES
0-4	1	0	0	1	1
5-9	2	0	0	2	2
10-14	10	0	0	10	10
15-19	7	0	0	7	7
20-24	9	0	0	9	9
25-29	12	0	0	12	12
30-34	8	0	0	8	8
35-39	11	0	0	11	11
40-44	7	0	0	7	7
45-49	3	0	0	3	3
50-54	5	0	0	5	5
55-59	1	0	0	1	1

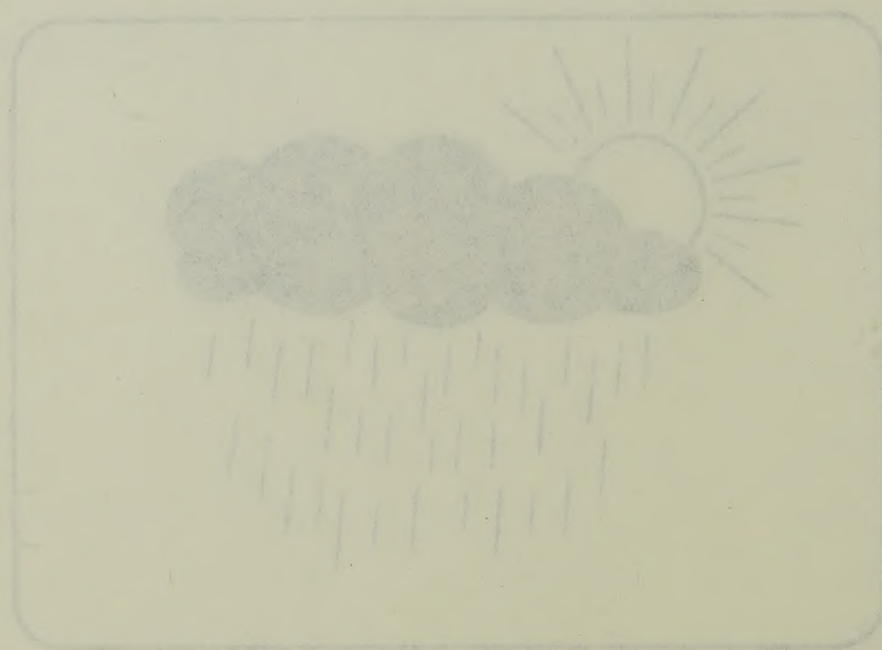
OF THE TOTAL NUMBER OF PEDESTRIANS INVOLVED IN COLLISIONS, 100% OF THE TOTAL NUMBER OF PEDESTRIANS INVOLVED IN COLLISIONS WERE RECORDED AS SUCH.

THE MOST FREQUENTLY REPORTED REASON FOR COLLISIONS INVOLVING PEDESTRIANS WAS FAILURE TO YIELD TO PEDESTRIANS.

OF ALL PEDESTRIANS INVOLVED IN COLLISIONS, 100% OF ALL PEDESTRIANS INVOLVED IN COLLISIONS SUFFERED NO INJURY OR ONLY MINIMAL OR MODERATE INJURY.



Chapter Five Environment



Chapter Five Environment



Chapter 5

Weather and Light Conditions

Exhibit 5.1 indicates that most collisions occurred during clear weather conditions and under daylight conditions.

Road Surface

64 percent of collisions occurred under dry pavement conditions (Exhibit 5.2).

Pavement Markings

As shown in Exhibit 5.3, 84 percent of collisions occurred on roadways where the pavement markings were visible. It is important to note that pavement markings that are not visible to the driver are not necessarily associated with collision cause. Further analysis would be necessary to indicate whether or not there was a causal relationship.

Road Characteristics

The majority of collisions occurred at locations with straight, level geometrics (Exhibit 5.4). Exhibit 5.5 shows that most collisions (both non-intersection and intersection) occurred on two-way, undivided roads.

Normalizing data such as the percentages of various categories of intersections and the traffic volumes passing through those intersections is not presently available, therefore it is not possible to state that one intersection type is less prone to collision occurrence than another. However, the reader is referred to Exhibit 6.2 and Exhibit 6.3 which rank intersections by the number of collisions and rate of collision occurrence.



Road Location

Exhibit 5.6 indicates that the greatest number of collisions occurred at non-intersection locations. If collisions occurring near or at intersections are combined, there were a greater number of collisions directly or indirectly related to intersections. As the exposure to vehicle conflicts is inherently greater at intersection locations, this result is not unexpected.

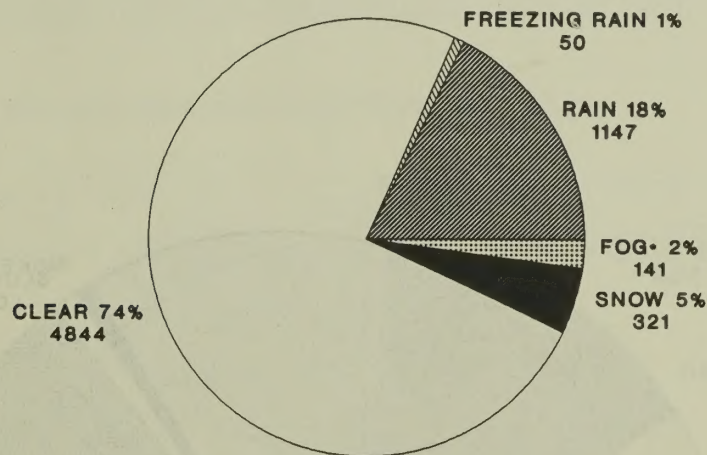
Fixed Objects

There were 951 recorded cases where vehicles struck fixed objects adjacent to the road (Exhibit 5.7). 439 drivers struck utility poles or curbs. In 1991 there were only 384 cases overall of a vehicle striking a fixed object. In 1985, however, there were 1,060 cases. It would appear that the 1985 and 1992 cases are more the norm. It is unknown why there were only 384 cases in 1991. Further study is necessary to determine whether these figures are due to reporting dollar levels or due to changes in insurance or are in fact because fewer objects are being struck.

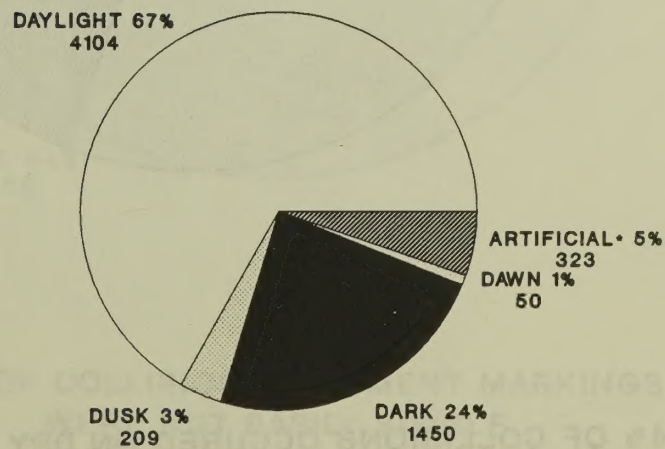


Exhibit 5.1

WEATHER AND LIGHT CONDITIONS IN MOTOR VEHICLE COLLISIONS



• INCLUDES FOG, MIST, SMOKE AND DUST



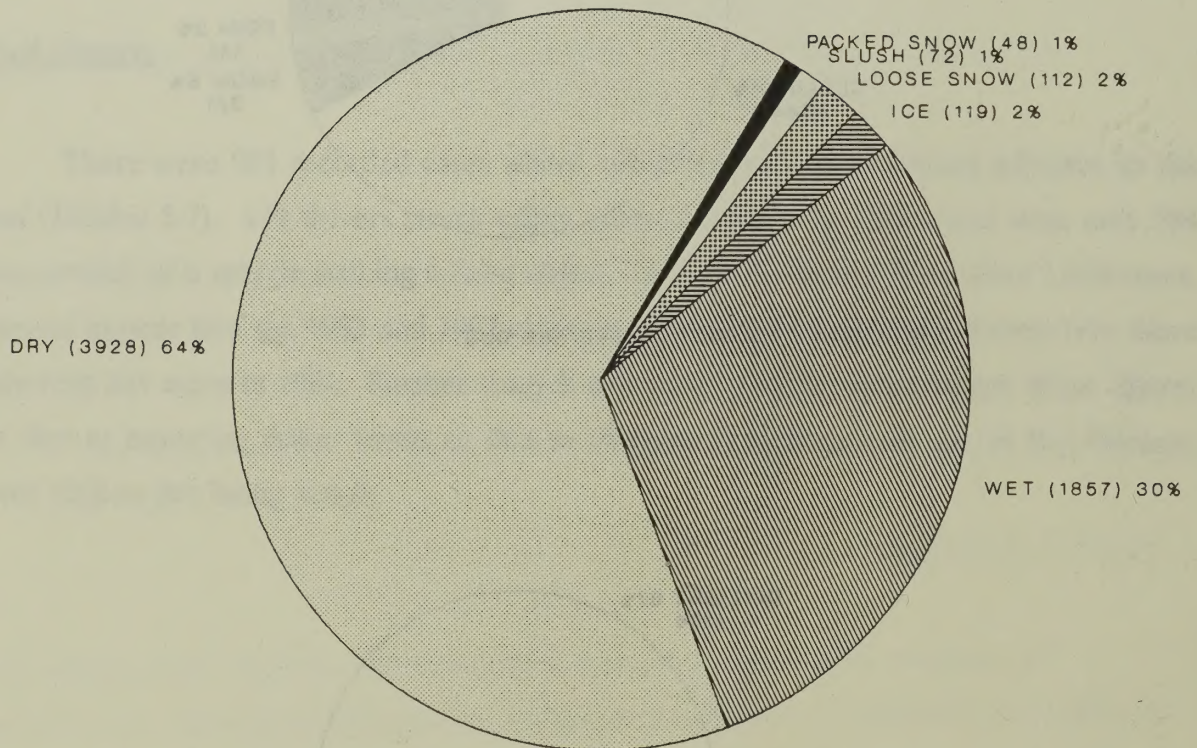
• INCLUDES ARTIFICIAL DAYLIGHT, DAWN, DUSK AND DARK

74% OF COLLISIONS OCCURRED DURING CLEAR WEATHER.
67% OF COLLISIONS OCCURRED IN DAYLIGHT.



Exhibit 5.2

ROAD SURFACE CONDITIONS IN MOTOR VEHICLE COLLISIONS

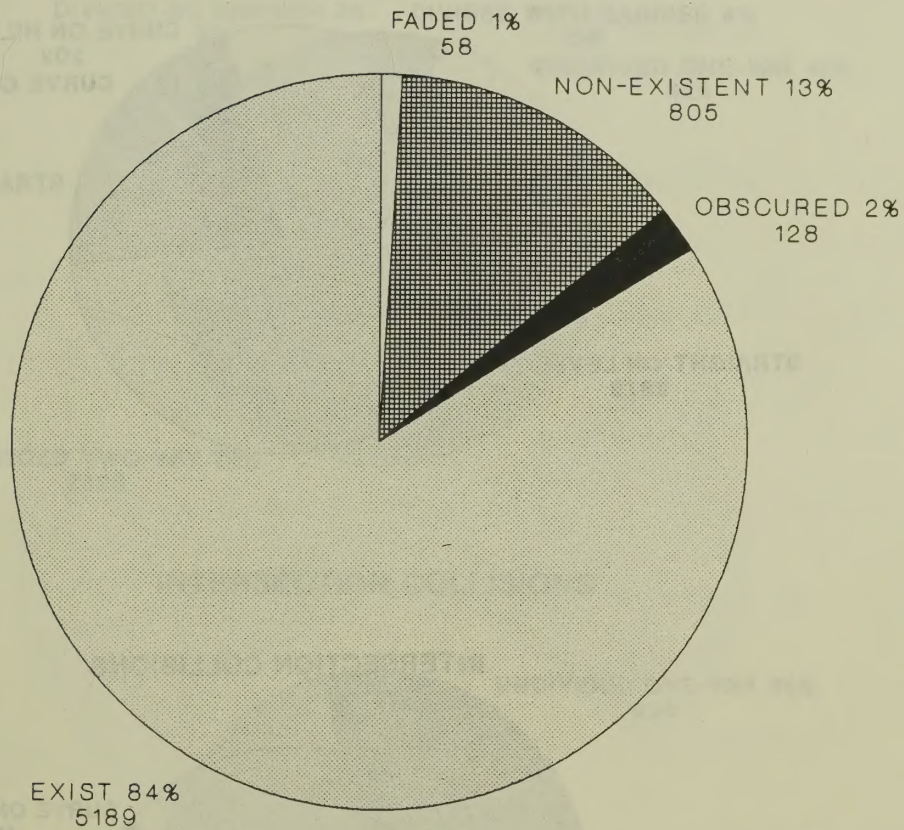


64% OF COLLISIONS OCCURED ON DRY ROAD SURFACES.



Exhibit 5.3

PAVEMENT MARKINGS IN MOTOR VEHICLE COLLISIONS

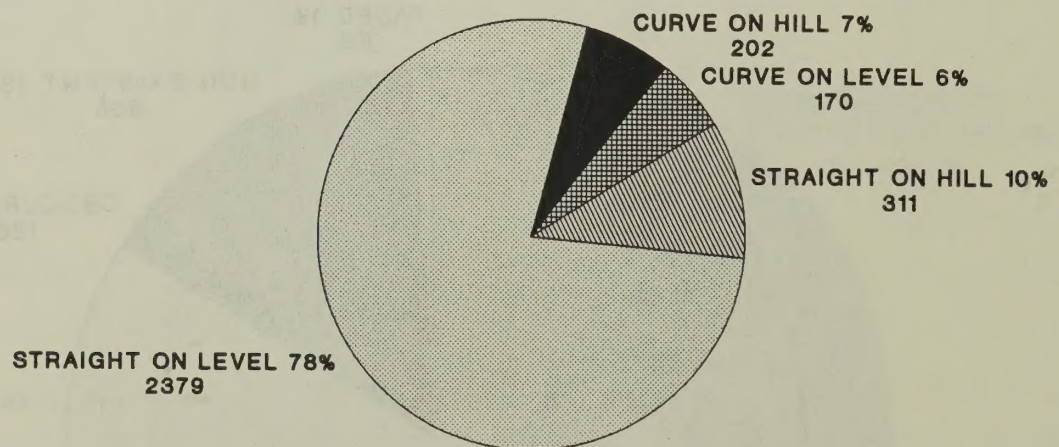


**IN 16% OF COLLISIONS, PAVEMENT MARKINGS
WERE NOT EASILY VISIBLE.**

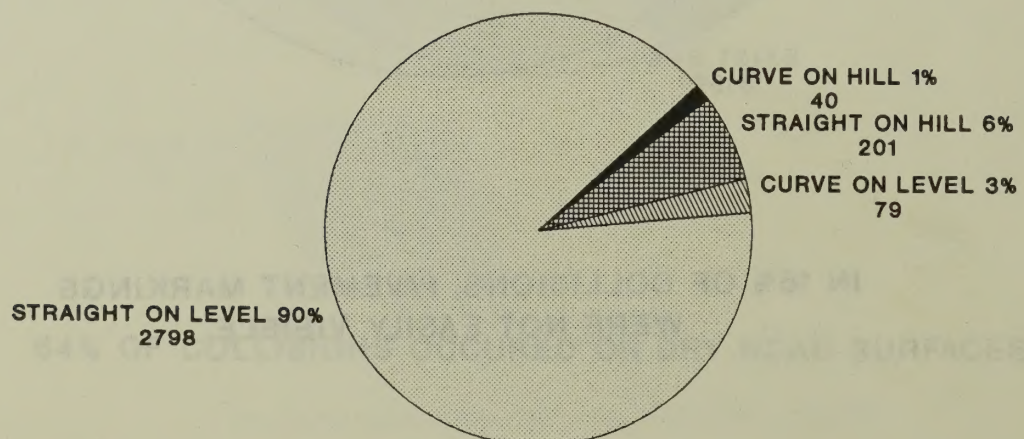


Exhibit 5.4 ROAD ALIGNMENT IN MOTOR VEHICLE COLLISIONS

NON-INTERSECTION COLLISIONS



INTERSECTION COLLISIONS

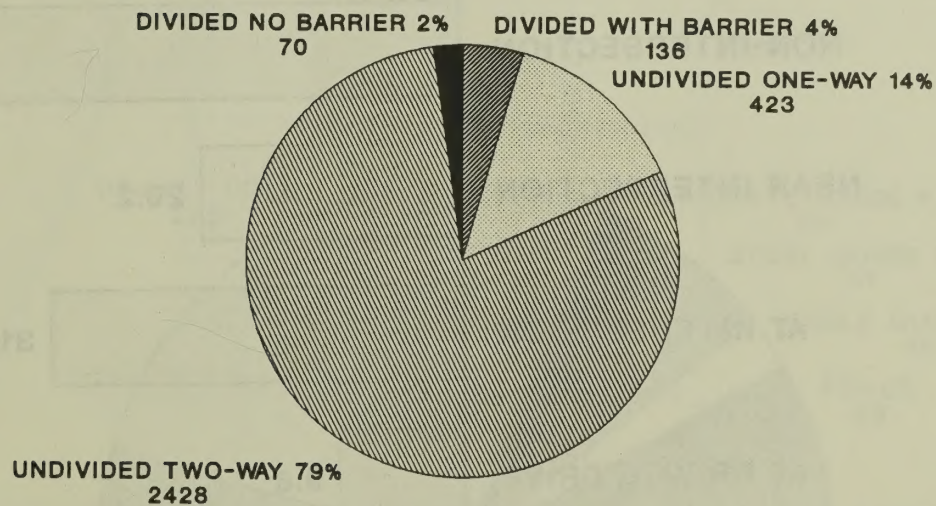


**MOST COLLISIONS OCCURRED AT LOCATIONS WITH
STRAIGHT, LEVEL GEOMETRICS.**

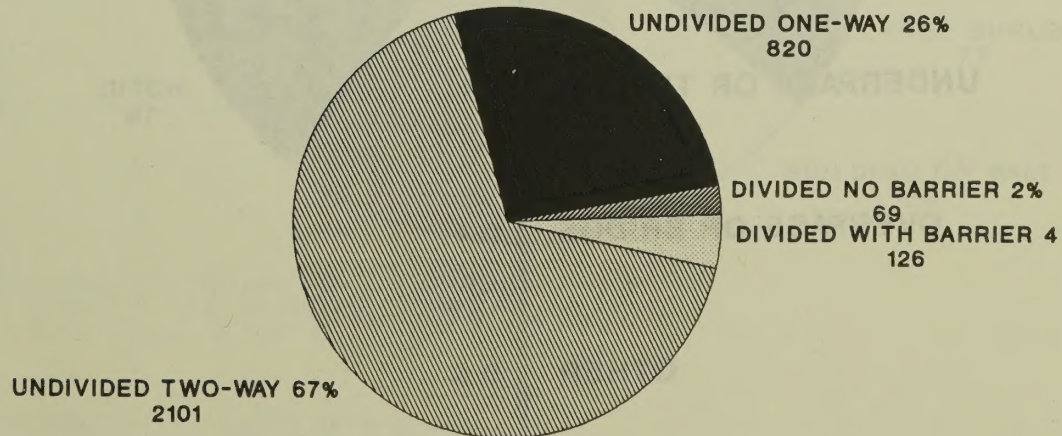


Exhibit 5.5 ROAD CHARACTERISTICS IN MOTOR VEHICLE COLLISIONS

NON-INTERSECTION COLLISIONS



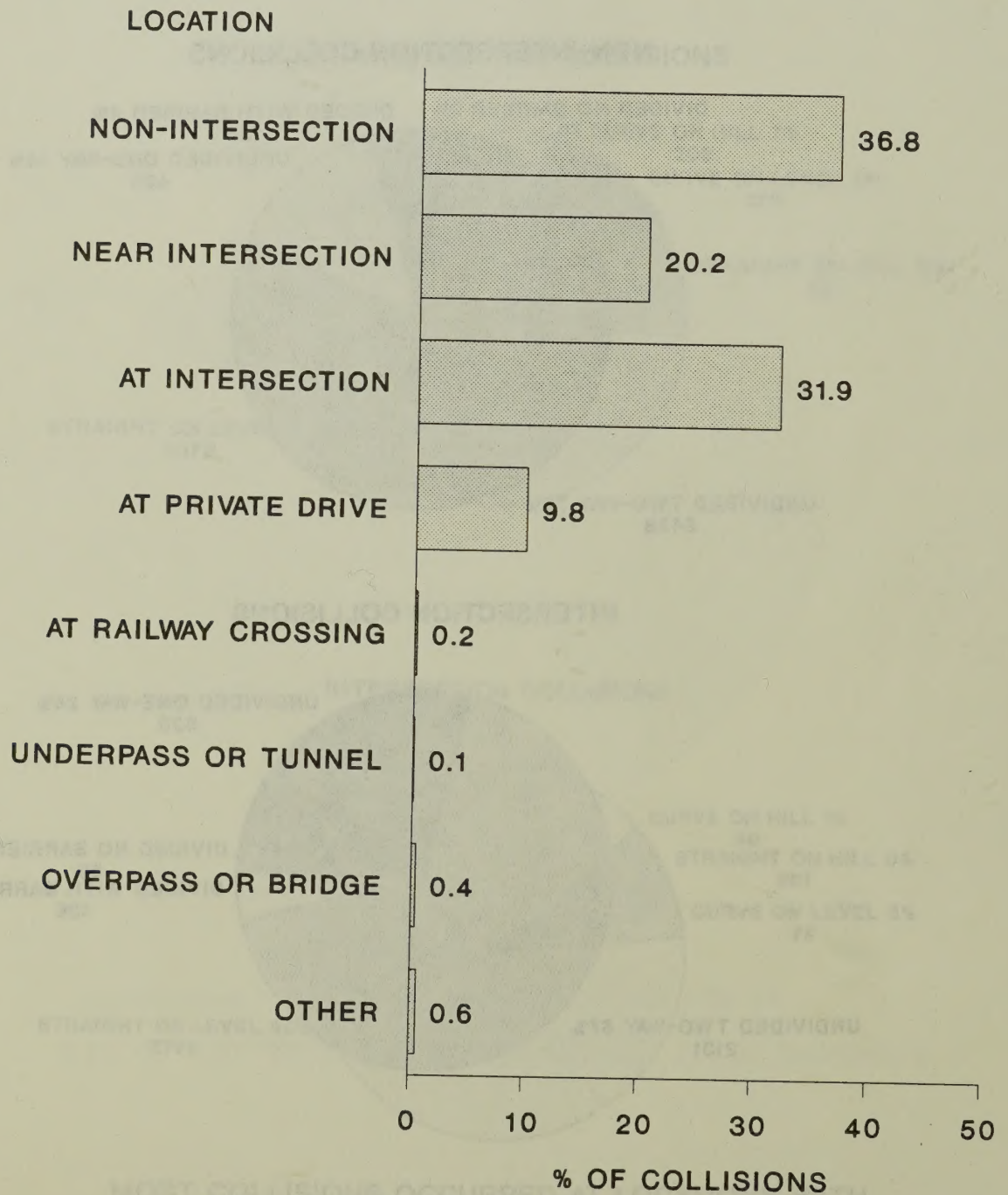
INTERSECTION COLLISIONS



**MOST COLLISIONS OCCURRED ON UNDIVIDED
TWO WAY ROADS**



Exhibit 5.6 LOCATION OF COLLISIONS

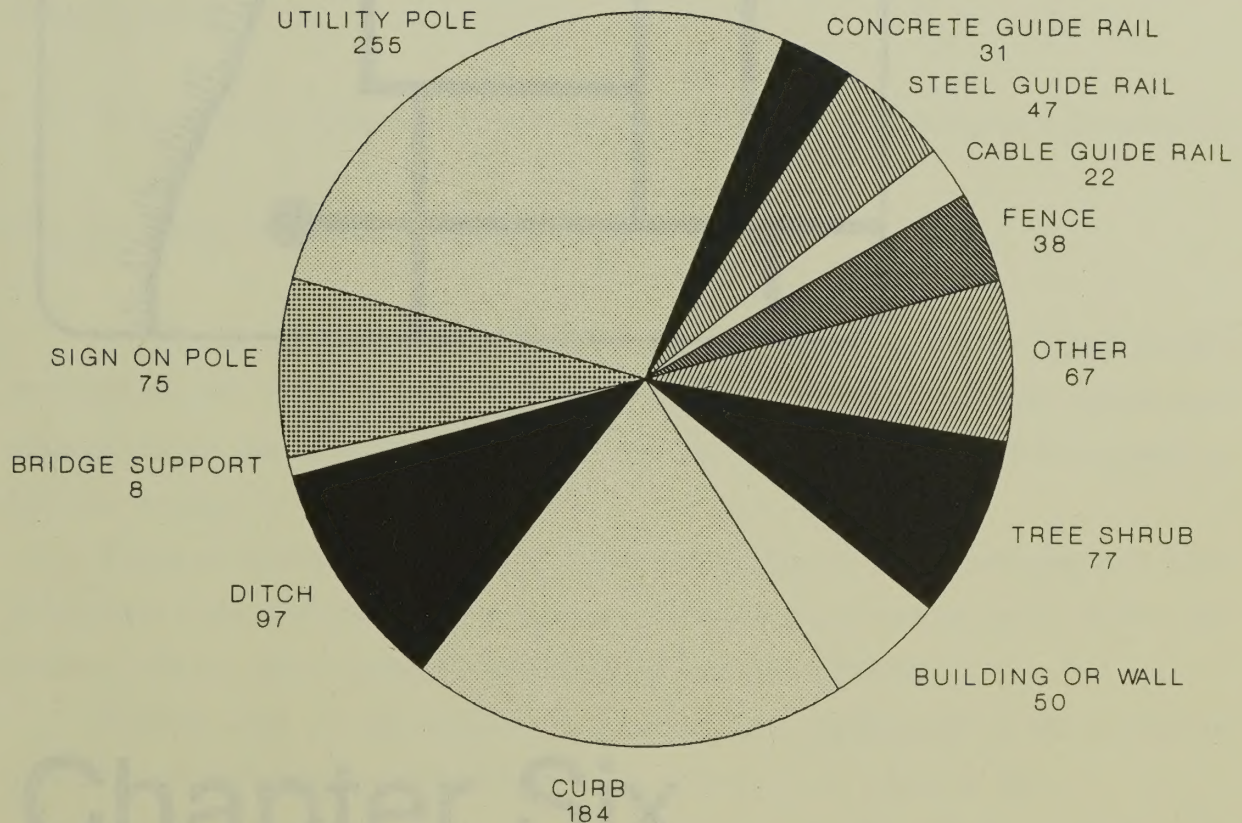


THE LARGEST NUMBER OF COLLISIONS
OCCURRED IN, OR NEAR INTERSECTIONS



Exhibit 5.7

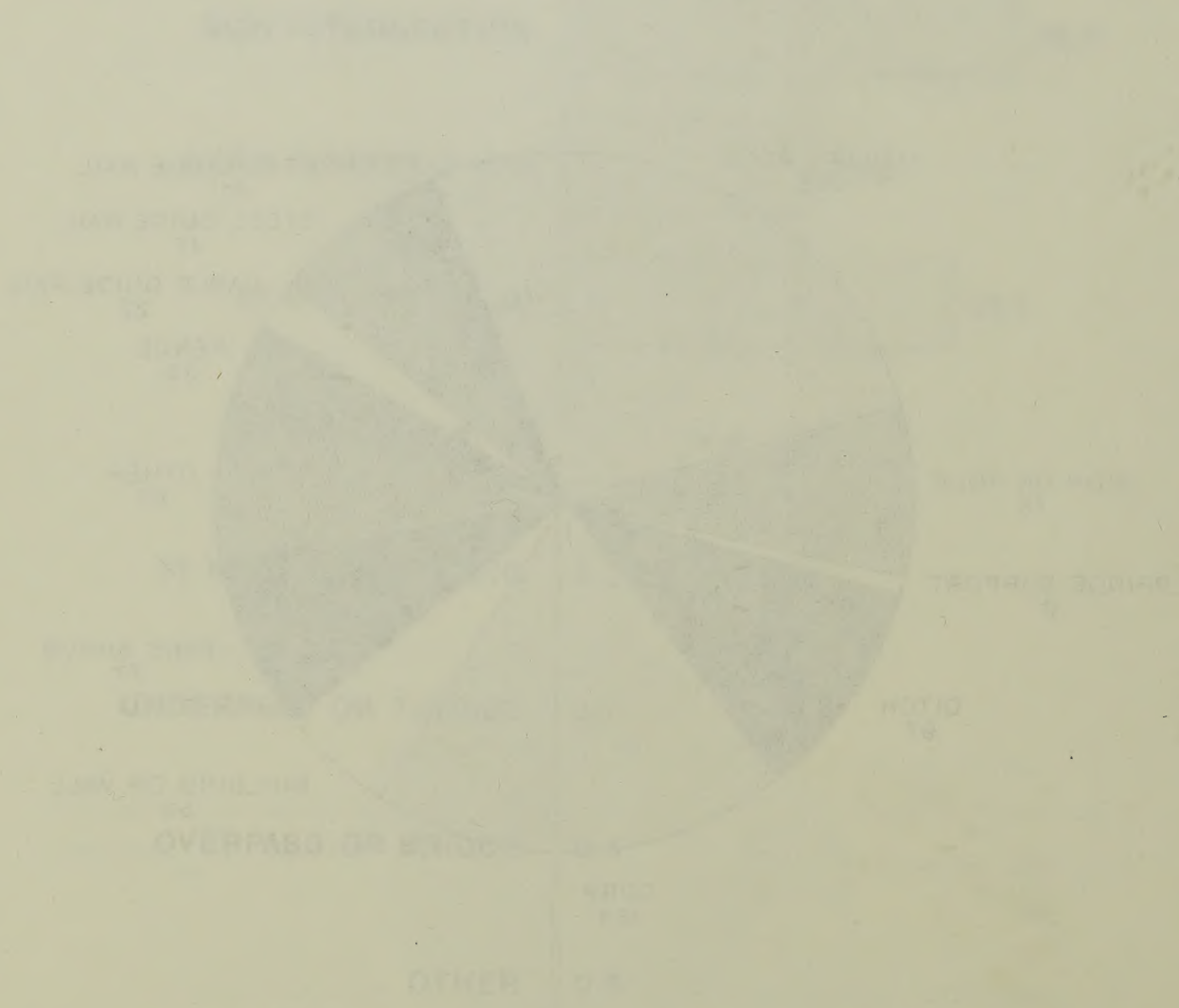
TYPES OF FIXED OBJECTS STRUCK IN MOTOR VEHICLE COLLISIONS



DRIVERS HITTING FIXED OBJECTS ARE MOST LIKELY TO STRIKE UTILITY POLES OR CURBS.

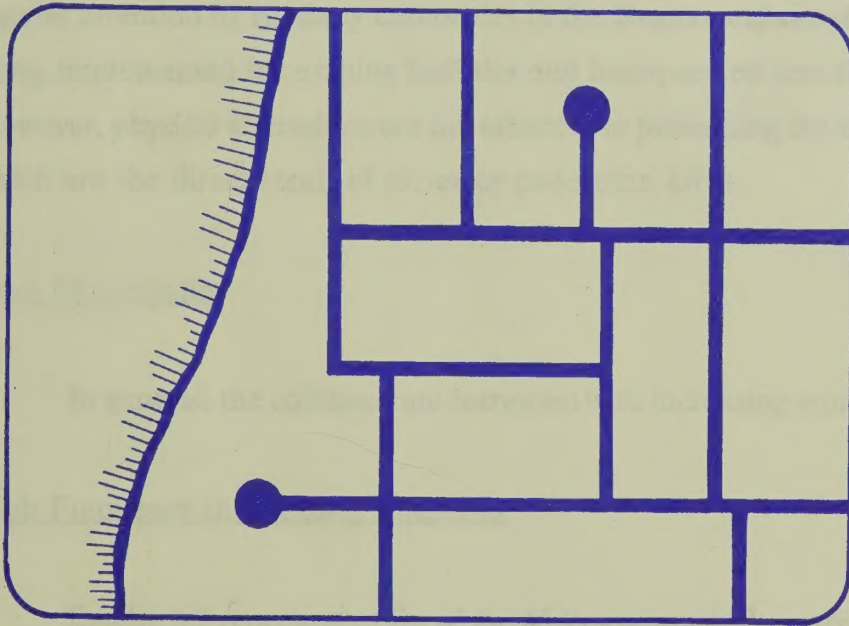


Exhibit B
TYPES OF FIXED OBJECTS STRUCK
IN MOTOR VEHICLE COLLISIONS



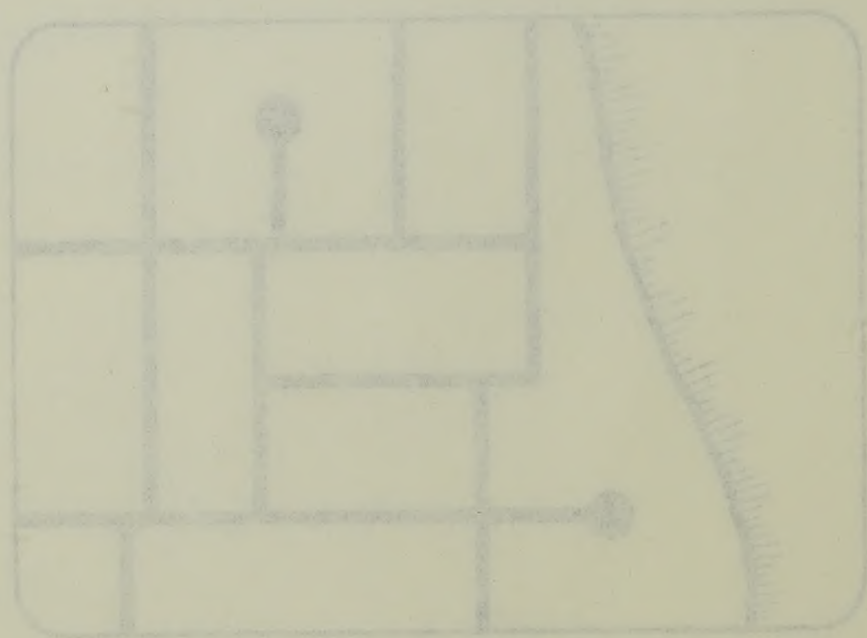
DRIVER HITTING FIXED OBJECTS ARE MOST LIKELY TO
BE STRUCK BY UTILITY POLES OR CURBS

THE LARGEST NUMBER OF COLLISIONS
OCCURRED IN OR NEAR INTERSECTIONS



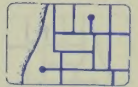
Chapter Six

Locations



Chapter Six

Locations



Chapter 6

General

Locations that have high numbers or rates of collision occurrences have received regular attention by roadway authorities in the Region and countermeasures are constantly being implemented for existing facilities and incorporated into the design of new facilities. However, physical alterations are not effective in preventing the majority of traffic collisions which are the direct result of driver or pedestrian error.

Area Municipality

In general, the collision rate increased with increasing municipality size (Exhibit 6.1).

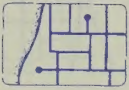
High Frequency Intersection Locations

Exhibit 6.2 represents a list of the 46 locations which experienced the highest number of collision occurrences in 1992. All 1992 collisions occurring at traffic signals were subjected to the control chart analysis technique (Exhibit 6.3). Exhibit 6.2 also provides a five year average for each intersection.

These exhibits do not necessarily represent priority list for improvements as other factors have to be taken into account such as cost-benefit considerations or the deployment of other collision countermeasures which may be more cost-effective.

In many cases, countermeasures have already been implemented or these locations are under consideration for various forms of improvement on a priority basis.

Exhibits 6.4, 6.5 and 6.6 provide data on rates of collision occurrence on roadway sections, showing the 25 sections of major roadway with the highest rates. Exhibit 6.4 shows rates calculated including all collisions on the roadway sections. Exhibit 6.5 shows rates which include collisions at unsignalized intersections but exclude collisions at signalized intersections. Exhibit 6.6 shows rates which are calculated excluding any collisions occurring within 9 m of an intersection (signalized or unsignalized).



Comparison of Hamilton and Hamilton-Wentworth with other Cities

On the basis of total collisions per 1000 population, Hamilton and Hamilton-Wentworth are very close to the lowest rates in Canada (Exhibit 6.7). On the basis of injury collisions per 1000 population, the City and Region are better than average.

On the basis of fatal collisions per 100,000 population (Exhibit 6.8) Hamilton has one of the best records of cities of similar size in North America.



Exhibit 6.1

COLLISIONS vs AREA MUNICIPALITY

MUNICIPALITY	CLASS OF COLLISION (a)				1991 COLLISIONS RATE PER 1,000 POP.(c)
	FATAL	NON- FATAL INJURY	PROPERTY DAMAGE ONLY	ALL COLLISIONS (b)	
ANCASTER	0	69	119	188	8.5
DUNDAS	2	90	130	222	10.2
FLAMBOROUGH	2	75	150	227	7.8
GLANBROOK	0	38	52	90	9.2
CITY OF HAMILTON	17	1834	3093	4944	15.5
STONEY CREEK	1	202	299	502	25.3
TOTAL FOR THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH	22	2308	3843	6173	13.7

(a) Collisions reported to the Hamilton-Wentworth Regional Police only; areas patrolled by the Provincial Police (e.g. Kings Highways) are not included.

(b) Location data missing from a small number of collisions.

(c) Population figure extrapolated based on 1988 population data for each municipality.

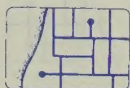
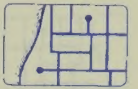


Exhibit 6.2

INTERSECTIONS WITH THE HIGHEST NUMBER OF COLLISIONS IN 1992 (a)

	INTERSECTION	TYPE OF TRAFFIC CONTROL	NUMBER OF COLLISIONS	5 YEAR AVERAGE	
				(b)	(c)
1	MOHAWK & UPPER OTTAWA	TRAFFIC SIGNAL	24	22.6	
2	DUNDURN & KING	TRAFFIC SIGNAL	20	19.4	
3	GARTH & LIMERIDGE	TRAFFIC SIGNAL	18	11.2	
4	NASH & QUEENSTON	TRAFFIC SIGNAL	17	13.0	
5	BAY & MAIN	TRAFFIC SIGNAL	16	21.6	
6	CANNON & VICTORIA	TRAFFIC SIGNAL	15	9.4	
7	DUNDURN & MAIN	TRAFFIC SIGNAL	15	20.2	
8	LIMERIDGE & UPPER GAGE	TRAFFIC SIGNAL	14	11.0	
9	CHARLTON & JAMES	TRAFFIC SIGNAL	13	9.8	
10	LOCKE & YORK	TRAFFIC SIGNAL	13	12.4	
11	ABERDEEN & DUNDURN	TRAFFIC SIGNAL	12	11.2	
12	BARTON & CENTENNIAL	TRAFFIC SIGNAL	12	13.6	
13	BARTON & GAGE	TRAFFIC SIGNAL	12	11.0	
14	FRUITLAND & SOUTH SERVICE	E/W STOP SIGNS	12	9.8	
15	HUGHSON & KING WILLIAM	NB STOP SIGN	12	8.4	
16	RYMAL & UPPER JAMES	TRAFFIC SIGNAL	12	9.6	
17	ABERDEEN & QUEEN	TRAFFIC SIGNAL	11	8.6	
18	BARTON & MACNAB	NB STOP SIGN	11	11.6	
19	CANNON & JOHN	TRAFFIC SIGNAL	11	6.4	
20	MOHAWK & UPPER WENTWORTH	TRAFFIC CIRCLE	11	10.4	
21	BARTON & WOODWARD	TRAFFIC SIGNAL	10	11.4	
22	CENTENNIAL & QUEENSTON	TRAFFIC SIGNAL	10	18.8	



INTERSECTION	TYPE OF TRAFFIC CONTROL	NUMBER OF COLLISIONS	5 YEAR AVERAGE
23 FENNELL & GARTH/SCENIC	TRAFFIC SIGNAL	10	17.0
24 KING & PARKDALE	TRAFFIC SIGNAL	10	12.0
25 KING & QUIGLEY	TRAFFIC SIGNAL	10	7.8
26 MAIN & VICTORIA	TRAFFIC SIGNAL	10	13.4
27 QUEEN & YORK	TRAFFIC SIGNAL	10	6.4
28 BARTON & LAKE	TRAFFIC SIGNAL	9	8.4
29 BAY & KING	TRAFFIC SIGNAL	9	8.8
30 CANNON & WELLINGTON	TRAFFIC SIGNAL	9	8.6
31 CHARLTON & JOHN	TRAFFIC SIGNAL	9	7.8
32 JOHN & WILSON	TRAFFIC SIGNAL	9	11.8
33 LARCH & UPPER OTTAWA	TRAFFIC SIGNAL	9	5.4
34 LIMERIDGE & UPPER JAMES	TRAFFIC SIGNAL	9	11.2
35 ABERDEEN & LONGWOOD	TRAFFIC SIGNAL	8	6.8
36 BARTON & BIRCH	TRAFFIC SIGNAL	8	7.4
37 CAROLINE & CHARLTON	SB STOP SIGN	8	4.2
38 CONCESSION & UPPER WELLINGTON	TRAFFIC SIGNAL	8	8.0
39 FENNELL & UPPER WELLINGTON	TRAFFIC SIGNAL	8	6.8
40 JOHN & MAIN	TRAFFIC SIGNAL	8	22.6
41 KENILWORTH ACCESS & MOUNTAIN BROW	TRAFFIC CIRCLE	8	6.2
42 KING & VICTORIA	TRAFFIC SIGNAL	8	9.6
43 MOHAWK & UPPER JAMES	TRAFFIC SIGNAL	8	13.8
44 MOHAWK & UPPER SHERMAN	TRAFFIC SIGNAL	8	6.4
45 MOUNT ALBION & MUD	TRAFFIC SIGNAL	8	5.4
46 QUEENSDALE & UPPER GAGE	TRAFFIC SIGNAL	8	7.8

- (a) Only collisions occurring within 31 feet (9.5 m) of the intersection are defined as being "in" the intersection and are included in this list.
- (b) Traffic signal planned for 1993.
- (c) All-way stop installed 1993 January 20.

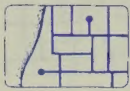
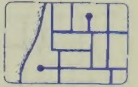


Exhibit 6.3

SIGNALIZED INTERSECTIONS WITH THE HIGHEST COLLISION RATES IN 1992

INTERSECTION	RL (a)	RC (b)	RL/RC	1990 AWDT (c)	NUMBER OF COLLISIONS					5 YR AVG. COMMENTS
					1988	1989	1990	1991	1992	
1 MOHAWK RD & UPPER OTTAWA ST	2.5	1.0	2.5	28066	25	30	18	16	24	22.6 (e)
2 HUNTER ST & CATHARINE ST	2.3	1.2	2.0	12397	18	19	2	3	2	8.8 (d)
3 CHARLTON AVE & HESS ST	1.8	1.2	1.6	11201	7	7	6	8	6	6.8 (h)
4 QUEENSDALE AVE & UPPER GAGE AVE	1.7	1.1	1.5	12980	11	9	8	3	8	7.8 (f)
5 MAIN ST & JOHN ST	1.6	0.9	1.7	41203	35	34	29	7	8	22.6 (f)
6 LIMERIDGE RD & GARTH ST	1.6	1.0	1.5	24134	6	6	18	8	18	11.2
7 WILSON ST & JOHN ST	1.4	1.0	1.4	23950	15	14	10	11	9	11.8
8 CHARLTON AVE & SHERMAN ACCESS	1.4	1.0	1.4	21040	17	9	7	11	7	10.2
9 FENNELL AVE & UPPER OTTAWA ST	1.3	1.0	1.3	29022	23	22	8	3	5	12.2 (g)
10 FENNELL AVE & GARTH ST	1.3	0.9	1.4	37118	23	20	12	18	12	17.0
11 YORK BLVD & HESS ST	1.3	1.0	1.3	20755	7	11	10	16	6	10.0
12 CANNON ST & GAGE AVE	1.3	1.0	1.3	25248	15	14	17	4	6	11.2
13 BRAMPTON ST & WOODWARD AVE	1.3	1.1	1.2	12948	6	8	7	6	4	6.2
14 MAIN ST & BAY ST	1.3	0.9	1.4	43207	36	25	15	16	16	21.6 (i)
15 LIMERIDGE RD & UPPER GAGE AVE	1.3	1.0	1.3	26854	11	12	10	8	14	11.0
16 STONE CHURCH RD & UPPER WENTWORTH ST	1.3	1.2	1.1	15228	99	99	99	99	5	5.0
17 HUNTER ST & HESS ST	1.3	1.2	1.1	10443	6	5	2	3	6	4.4
18 CHARLTON AVE & QUEEN ST	1.3	1.1	1.2	16076	5	9	7	9	7	7.4
19 BARTON ST & JOHN ST	1.2	1.1	1.1	20217	13	10	6	8	3	8.0
20 QUEENSDALE AVE & UPPER WENTWORTH ST	1.2	1.1	1.1	12980	6	16	1	2	3	5.6
21 LIMERIDGE RD & UPPER WENTWORTH ST	1.2	1.0	1.1	24105	5	15	12	5	6	8.6
22 HUNTER ST & CAROLINE ST	1.2	1.2	1.0	8171	1	7	1	3	4	3.2
23 BARTON ST & BAY ST	1.2	1.1	1.0	12862	9	4	5	3	4	5.0
24 ABERDEEN AVE & DUNDURN ST	1.2	1.0	1.2	30674	13	6	11	14	12	11.2



INTERSECTION	1990		NUMBER OF COLLISIONS										5 YR	
	RL (a)	RC (b)	RL/RC	AWDT (c)	12	10	6	8	13	13	13	13	AVG.	COMMENTS
25 CHARLTON AVE & JAMES ST	1.2	1.0	1.1	24259	12	10	6	8	13	13	13	13	9.8	
26 MAIN ST & DUNDURN ST	1.2	0.9	1.3	48628	18	26	17	26	14	20.2	20.2	20.2		
27 KING ST & PARKDALE AVE	1.1	1.0	1.2	32463	19	15	7	9	10	12.0	12.0	12.0		
28 KING ST & DUNDURN ST	1.1	0.9	1.2	47961	29	18	16	14	20	19.4	19.4	19.4		
29 KING WILLIAM ST & JAMES ST	1.1	1.4	0.8	4135	4	0	2	2	0	1.6	1.6	1.6		
30 KENTLEY DR & NASH RD	1.1	1.1	1.0	13178	4	5	8	6	2	5.0	5.0	5.0		
31 BARTON ST & GAGE AVE	1.1	1.0	1.1	30198	15	13	6	9	12	11.0	11.0	11.0		
32 KING WILLIAM ST & CATHARINE ST	1.1	1.2	0.9	7310	3	2	2	6	4	3.4	3.4	3.4		
33 LARCH ST & UPPER OTTAWA ST	1.1	1.1	1.0	15584	10	4	3	1	9	5.4	5.4	5.4		
34 KING ST & JAMES ST	1.1	1.0	1.1	26413	16	12	10	9	2	9.8	9.8	9.8		
35 BARTON ST & WOODWARD AVE	1.0	1.0	1.1	31856	16	19	6	6	10	11.4	11.4	11.4		
36 CANNON ST & OTTAWA ST	1.0	1.0	1.0	21412	15	11	5	6	7	8.8	8.8	8.8		
37 QUEENSTON RD & NASH RD	1.0	0.9	1.1	36779	13	17	8	10	17	13.0	13.0	13.0		
38 QUEENSTON RD & CENTENNIAL PKWY	1.0	0.9	1.1	54412	30	20	20	14	10	18.8	18.8	18.8		
39 FENNEL AVE & CLARENDON AVE	1.0	1.1	0.9	15534	5	11	7	3	4	6.0	6.0	6.0		
40 BURLINGTON ST & GAGE AVE	1.0	1.0	1.0	24443	6	15	6	12	5	8.8	8.8	8.8		
41 CANNON ST & JAMES ST	1.0	1.0	1.0	28207	11	10	11	9	7	9.6	9.6	9.6		
42 LIMERIDGE RD & UPPER JAMES ST	1.0	1.0	1.0	36008	13	15	8	11	9	11.2	11.2	11.2		
43 GOVERNORS RD & OGILVIE ST (DUN)	1.0	1.1	0.9	17751	4	8	8	3	4	5.4	5.4	5.4		
44 BRAMPTON ST & PARKDALE AVE	1.0	1.0	0.9	19069	10	8	6	6	3	6.6	6.6	6.6		
45 CANNON ST & HESS ST	0.9	1.0	0.9	23320	14	4	12	4	6	8.0	8.0	8.0		
46 BARTON ST & BIRCH AVE	0.9	1.0	0.9	23230	11	3	10	5	8	7.4	7.4	7.4		
47 HUNTER ST & BAY ST	0.9	1.1	0.8	14740	2	8	7	4	4	5.0	5.0	5.0		
48 MAIN ST & VICTORIA AVE	0.9	0.9	1.0	41004	20	19	9	9	10	13.4	13.4	13.4		
49 CANNON ST & VICTORIA ST	0.9	1.0	0.9	29603	11	9	5	7	15	9.4	9.4	9.4		
50 JACKSON ST & JOHN ST	0.9	1.0	0.9	19123	6	8	6	8	4	6.4	6.4	6.4		
OVERALL STATISTICS FOR ALL SIGNALS:													5.2	

OVERALL STATISTICS FOR ALL SIGNALS: 0.6

NUMBER OF HAMILTON - WENTWORTH TRAFFIC SIGNALS IN OPERATION AS OF JAN. 1, 1992 = 331



Notes:

- (a) RL is the number of collisions, per million vehicles entering the intersection, occurring within 31 feet of an individual intersection.
- (b) RC is a volume-adjusted critical rate. If RL exceeds RC (ie. RL/RC is greater than 1.0), one can state with 95 percent confidence that the collision rate at the intersection in question is significantly higher than would normally be expected.

$$RC = Ra + K(\text{the square root of: } (Ra/m)) - (0.5/m)$$

Where: Ra = systemwide average collision rate for all traffic signal locations
(0.72 collisions per million vehicle entries)

K = constant (= 1.65 for 95 % confidence level)

m = vehicle exposure at the location in million vehicles
entering per year (AWDTx340/1,000,000)

- (c) AWDT - Average Weekday Daily Traffic (total vehicles entering the intersection).

REGARDING SPECIFIC INTERSECTIONS:

- (d) Signalized in 1990 - collision rate has been greatly reduced.
- (e) To be reconstructed in 1993 or 1994 to provide channelized left turn lanes.
- (f) Intersection provided with physical barriers to discourage illegal northbound movements in "must turn lane" in 1991.
- (g) Reconstructed to provide left turn channelization in 1990.
- (h) Left turn lanes painted in 1990.
- (i) Temporary delineation to discourage illegal movements installed in 1991. Permanent installation placed in 1993.

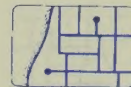
ROADWAY SECTIONS WITH THE HIGHEST COLLISION RATES, 1988 - 1992

CITY OF HAMILTON ARTERIALS

(ALL INTERSECTIONS INCLUDED) (a)

Arterial Street	From	To	Number of Collisions	R _L	R _C	Ratio	Link Length (Km)	Link Volume (AWDT)	Million Veh-Km Per Year
1. DALEWOOD	KING	MAIN	12.0	24.00	9.69	2.48	.220	1313	0.10
2. JAMES	BARTON	MURRAY	28.0	23.33	8.86	2.63	.120	5786	0.24
3. CANNON	GAGE	OTTAWA	176.0	17.43	6.22	2.80	.866	6688	2.02
4. CANNON	SHERMAN	GAGE	154.0	11.94	6.00	1.99	.891	8278	2.58
5. JAMES	KING	BARTON	171.0	11.79	5.90	2.00	.860	9634	2.90
6. QUEENSTON	NASH	REGIONAL LIMITS	183.0	11.37	5.82	1.95	.823	11175	3.22
7. KING	QUEEN	JAMES	363.0	11.05	5.34	2.07	.860	21842	6.57
8. MAIN	OTTAWA	KENILWORTH	215.0	10.62	5.65	1.88	.836	13845	4.05
9. JOHN	ST JOSEPH'S	KING	282.0	10.58	5.47	1.93	.976	15613	5.33
10. CHARLTON	QUEEN	JAMES	108.0	10.43	6.19	1.68	.823	7211	2.07
11. BAY	KING	CANNON	79.0	10.33	6.49	1.59	.450	9702	1.53
12. CHARLTON	JAMES	JOHN	37.0	9.87	7.31	1.35	.244	8840	0.75
13. BAY	HERKIMER	KING	170.0	9.60	5.75	1.67	.924	10950	3.54
14. BARTON	GAGE	OTTAWA	262.0	9.05	5.41	1.67	.860	19256	5.79
15. STINSON	VICTORIA	WENTWORTH	47.0	9.04	6.91	1.31	.665	4473	1.04
16. CANNON	OTTAWA	BARONS	125.0	8.99	5.94	1.51	1.190	6688	2.78
17. KING	WELLINGTON	WENTWORTH	326.0	8.68	5.26	1.65	.866	24800	7.51
18. BARTON	JAMES	WELLINGTON	183.0	8.51	5.61	1.52	.836	14711	4.30
19. KING	GAGE	MAIN	119.0	8.41	5.92	1.42	.610	13281	2.83
20. JAMES	ST JOSEPH'S	KING	226.0	8.06	5.43	1.48	.968	16578	5.61
21. KING	CATHARINE	WELLINGTON	147.0	8.01	5.72	1.40	.531	19748	3.67
22. BARTON	QUEEN	JAMES	122.0	8.00	5.86	1.37	.872	10004	3.05
23. WENTWORTH	BARTON	BURLINGTON	74.0	8.00	6.30	1.27	1.031	5134	1.85
24. MAIN	JAMES	WELLINGTON	329.0	7.99	5.21	1.53	.866	27208	8.24
25. BARTON	WENTWORTH	SHERMAN	212.0	7.68	5.44	1.41	.842	18755	5.52
ALL CITY OF HAMILTON ARTERIAL STREETS					4.11				

(a) Please refer to Notes on Page 78.



Notes: Re: Collision Rates on Roadway Sections

1. Exhibit 6.4 Includes all collisions on an arterial roadway section. If the roadway section ends at an intersection, signalized or unsignalized, one-half the number of collisions occurring at the intersection is included.
2. Exhibit 6.5 Includes all collisions on an arterial roadway section excluding those which occur within nine metres of a signalized intersection. If the roadway section ends at an unsignalized intersection, one-half the number of collisions occurring at the intersection is included.
3. Exhibit 6.6 Includes only collisions on an arterial roadway section which occur greater than nine metres from any intersection. That is, no collisions referenced to an intersection, signalized or unsignalized, are included.
4. R_L is the collision rate for the roadway section expressed as collisions per million vehicle kilometres travelled per annum.
5. R_C is a volume-adjusted critical rate. If R_L exceeds R_C (i.e. R_L is greater than 1.00), one can state with 95 percent confidence that the

collision rate for the roadway section in question is significantly higher than would normally be expected.

$$R_C = R_L + K \sqrt{\frac{R_L}{m} - \frac{0.5}{m}}$$

where R_L = systemwide average collision rate for all roadway sections (4.31 collisions per million vehicle kilometres in 1988-1992 for Exhibit 6-4; 2.49 collisions per million vehicle kilometres in 1988-1992 for Exhibit 6-5; 1.58 collisions per million vehicle kilometres in 1988-1992 for Exhibit 6-6).

K = constant = 1.65 (for 95% confidence level)

m = vehicle exposure for the individual roadway section in million vehicle kilometres per year:

$$(AWDT \times \frac{349.6}{10^6} \times \text{Section Length})$$

6. AWDT - Average Weekday Daily Traffic

ROADWAY SECTIONS WITH THE HIGHEST COLLISION RATES, 1988 - 1992

CITY OF HAMILTON ARTERIALS

(SIGNALIZED INTERSECTIONS NOT INCLUDED) (a)

Arterial Street	From	To	Number of Collisions	R _L	R _C	Ratio	Link Length (Km)	Link Volume (AWDT)	Million Veh-Km Per Year
1. DALEWOOD	KING	MAIN	10.0	20.00	5.40	3.70	.220	1313	0.10
2. JAMES	BARTON	MURRAY	14.0	11.67	5.47	2.13	.120	5786	0.24
3. CANNON	GAGE	OTTAWA	99.0	9.80	3.91	2.51	.866	6688	2.02
4. STINSON	VICTORIA	WENTWORTH	46.0	8.85	4.38	2.02	.665	4473	1.04
5. CANNON	SHERMAN	GAGE	106.0	8.22	3.76	2.19	.891	8278	2.58
6. MAIN	OTTAWA	KENILWORTH	143.0	7.06	3.51	2.01	.836	13845	4.05
7. QUEENSTON	NASH	REGIONAL LIMITS	110.0	6.83	3.63	1.88	.823	11175	3.22
8. JAMES	MURRAY	BURLINGTON	66.0	6.70	3.93	1.70	.890	6336	1.97
9. BARTON	GAGE	OTTAWA	183.0	6.32	3.34	1.89	.860	19256	5.79
10. CHARLTON	QUEEN	JAMES	65.0	6.28	3.89	1.61	.823	7211	2.07
11. WENTWORTH	BARTON	BURLINGTON	57.0	6.16	3.97	1.55	1.031	5134	1.85
12. JAMES	KING	BARTON	88.0	6.07	3.69	1.64	.860	9634	2.90
13. KING	GAGE	MAIN	84.0	5.94	3.70	1.61	.610	13281	2.83
14. KING	QUEEN	JAMES	195.0	5.94	3.28	1.81	.860	21842	6.57
15. KING	WELLINGTON	WENTWORTH	223.0	5.94	3.23	1.84	.866	24800	7.51
16. MAIN	KING	OTTAWA	102.0	5.85	3.59	1.63	.366	27254	3.49
17. BARTON	QUEEN	JAMES	90.0	5.90	3.66	1.61	.872	10004	3.05
18. BAY	KING	CANNON	44.0	5.75	4.10	1.40	.450	9702	1.53
19. CANNON	OTTAWA	BARONS	79.0	5.68	3.71	1.53	1.190	6688	2.78
20. CHARLTON	JAMES	JOHN	21.0	5.60	4.64	1.21	.244	8840	0.75
21. KENILWORTH	KENIL ACCESS	MAIN	129.0	5.31	3.42	1.55	.695	19991	4.86
22. WEST 5TH	RYMAL	STONECHURCH	16.0	5.08	4.78	1.06	1.021	1769	.63
23. BARTON	JAMES	WELLINGTON	108.0	5.02	3.48	1.44	.836	14711	4.30
24. ARKELDUN	JOLLEY CUT	JOHN	59.0	5.00	3.81	1.31	.400	16892	2.36
25. BARTON	WELLINGTON	WENTWORTH	126.0	4.75	3.38	1.41	.872	17414	5.31
ALL CITY OF HAMILTON ARTERIAL STREETS									2.37

(a) Please refer to Notes on Page 78.

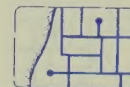




Exhibit 6.6

ROADWAY SECTIONS WITH THE HIGHEST COLLISION RATES, 1988 - 1992

CITY OF HAMILTON ARTERIALS

(INTERSECTIONS NOT INCLUDED) (a)

Arterial Street	From	To	Number of Collisions	R _L	R _C	Ratio	Link Length (Km)	Link Volume (AWDT)	Million Veh-Km Per Year
1. JAMES	BARTON	MURRAY	8.0	6.67	3.57	1.87	.120	5786	0.24
2. QUEENSTON	NASH	REGIONAL LIMITS	104.0	6.46	2.48	2.60	.823	11175	3.22
3. KING	QUEEN	JAMES	195.0	5.94	2.22	2.68	.860	21842	6.57
4. ARKLEDUN	JOLLEY CUT	JOHN	52.0	4.41	2.62	1.68	.400	16892	2.36
5. LIMERIDGE	UP WENT.	UPPER SHERMAN	97.0	4.29	2.35	1.83	.808	15992	4.52
6. JAMES	KING	BARTON	59.0	4.07	2.53	1.61	.860	9634	2.90
7. CANNON	SHERMAN	GAGE	50.0	3.88	2.58	1.50	.891	8278	2.58
8. STINSON	VICTORIA	WENTWORTH	20.0	3.85	3.02	1.27	.665	4473	1.04
9. BAY	KING	CANNON	28.0	3.66	2.82	1.30	.450	9702	1.53
10. MAIN	OTTAWA	KENILWORTH	74.0	3.65	2.39	1.53	.836	13845	4.05
11. ST. JOSEPH'S	JAMES	JOHN	27.0	3.55	2.83	1.25	.256	16970	1.52
12. MAIN	PARADISE	DUNDURN	111.0	3.50	2.24	1.56	.907	20024	6.35
13. UP JAMES	LIMERIDGE	MOHAWK	164.0	3.41	2.11	1.62	1.049	26199	9.61
14. MAIN	KING	OTTAWA	59.0	3.38	2.45	1.38	.366	27254	3.49
15. CHARLTON	WELLINGTON	WENTWORTH	63.0	3.29	2.42	1.36	.854	12835	3.83
16. KING	WELLINGTON	WENTWORTH	120.0	3.20	2.18	1.47	.866	24800	7.51
17. BARTON	GAGE	OTTAWA	92.0	3.18	2.27	1.40	.860	19256	5.79
18. CANNON	GAGE	OTTAWA	32.0	3.17	2.69	1.18	.866	6688	2.02
19. MTN. BROW	MOHAWK	LIMERIDGE	30.0	3.17	2.72	1.17	1.220	4430	1.89
20. KENILWORTH	KENIL. ACCESS	MAIN	77.0	3.17	2.33	1.36	.695	19991	4.86
21. WENTWORTH	BARTON	BURLINGTON	28.0	3.03	2.73	1.11	1.031	5134	1.85
22. BARTON ST	NASH RD	CENTENNIAL PKWY	108.0	3.35	2.25	1.49	.836	27530	8.05
23. YORK	QUEEN	JAMES	66.0	2.97	2.36	1.26	.921	13784	4.44
24. BARTON	JAMES	WELLINGTON	62.0	2.88	2.37	1.22	.836	14711	4.30
25. MAIN	JAMES	WELLINGTON	114.0	2.77	2.16	1.28	.866	27208	8.24
ALL CITY OF HAMILTON ARTERIAL STREETS									1.58

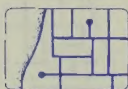
(a) Please refer to Notes on page 78.



Exhibit 6.7

1992 COLLISION STATISTICS – SELECTED CANADIAN CITIES

CITY OR REGIONAL MUNICIPALITY	POPULATION	PROPERTY DAMAGE ONLY COLLISION REPORTING LEVEL	COLLISION REPORTING CRITERIA (1)			TOTAL COLLISIONS	COLLISIONS /1000 POPULATION		INJURY COLLISIONS /1000 POPULATION	
			(a)	(b)	(c) (d)					
CITIES										
HAMILTON	324,369	700	N	N	Y Y	f	4,944	15.2	1,834	5.7
BURLINGTON (1991)	129,500	700	Y	Y	Y Y	e, f	1,593	12.3	570	4.4
CALGARY	717,133	1000	N	N	N Y	e, f	27,789	38.8	2,362	3.3
EDMONTON	618,195	1000	N	N	N Y		20,375	33.0	4,585	7.4
GUELPH (1991)	87,000	700	Y	Y	Y Y	e, f	1,334	15.3	398	4.6
HALIFAX	114,455	500	Y	Y	Y Y		4,246	37.1	570	5.0
LONDON	304,000	700	Y	Y	Y Y		8,019	26.4	2,935	9.7
MONTREAL	1,019,000	500	N	N	N Y	g	26,700	26.2	5,289	5.2
MISSISSAUGA	480,000	700	N	N	N Y		5,232	10.9	1,058	2.2
REGINA	179,178	500	N	N	N Y	f	6,953	38.8	1,252 (2)	7.0
ST. CATHARINES	124,689 (1990)	700	Y	Y	Y Y	f	2,932	23.5	N/A	N/A
SASKATOON	184,255	1000	N	N	N Y		8,399	45.6	1,001	5.4
METRO TORONTO(1991)	2,133,559	700	Y	Y	Y Y	e, f	53,029	24.9	18,624 (3)	8.7
VANCOUVER (1991)	471,844	1000	N	N	N Y	f	19,835	42.0	6,021	12.8
WINDSOR	191,000	1000	Y	Y	Y Y		7,164	37.5	2,312	12.1
WINNIPEG	629,138	1000	Y	Y	Y Y		18,845	30.0	7,244	11.5



CITY OR REGIONAL MUNICIPALITY	POPULATION	PROPERTY DAMAGE ONLY COLLISION REPORTING LEVEL	COLLISION REPORTING CRITERIA (1)				TOTAL COLLISIONS	COLLISIONS		INJURY			
			(a)	(b)	(c)	(d)		Other	/1000	POPULATION	COLLISIONS	/1000	POPULATION
REGIONS													
REGIONAL HAMILTON – WENTWORTH (4)	451,684	\$700	N	N	Y	Y	f	6,180	13.7	2,312	5.1		
REGION OF HALTON (5)	313,136	700	N	N	Y	Y		4,428	14.1	979	3.1		
REGIONAL OTTAWA – CARLTON	680,170	700	Y	Y	Y	Y	f	17,060	25.1	4,356	6.3		
REGIONAL MUNICIPALITY OF PEEL (6)	732,798	700	N	N	N	Y	e	3,021	4.1	791	6.3		
REGIONAL WATERLOO (1991)	389,817	700	Y	Y	Y	Y	f	9,471	24.3	1,421	3.7		

(1) KEY TO CRITERIA FOR REPORTING COLLISIONS (See next page for definitions of injury collisions)

It is generally assumed, unless otherwise noted, that only collisions occurring on public roadways involving personal injury or property damage greater than the reporting level are included on this table.

(a) Collisions reported involving an infraction of the Provincial Highway Traffic Act with property damage only and less than reporting level.

(b) Collisions reported involving an infraction of the Criminal Code of Canada with property damage only and less than reporting level.

(c) Hit and run collisions reported with property damage only and less than reporting level.

(d) Collisions reported if it involves any personal injury.

(e) Public property damage collisions.

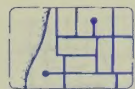
(f) Collisions involving City or Regional government vehicles.

(2) Only injuries requiring medical attention were classified as injury collisions.

(3) Injury collisions do not include fatal accidents.

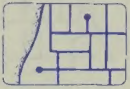
(4) Not including Kings Highways.

(5) and (6) Regional municipality statistics are for Regional roads only and do not include Burlington, in the case of Halton, or Mississauga, in the case of Peel. Thus, the collision rates stated will substantially underrepresent the actual rates.



DEFINITIONS OF "PERSONAL INJURY" (a)

Regional Hamilton-Wentworth	-	any bodily harm, visible or complained of, that results from a motor vehicle collision.
City of Hamilton	-	any bodily harm, visible or complained of, that results from a motor vehicle collision.
Burlington	-	any bodily harm, visible or complained of, that results from a motor vehicle collision.
Calgary	-	any type of injury resulting from a collision.
Edmonton	-	including minor abrasions and bruises, complaint of pain, caused by a motor vehicle collision.
Guelph	-	any bodily harm, visible or complained of, that results from a motor vehicle collision.
Halifax	-	injury or death (no stipulation regarding severity of injury) caused by a motor vehicle collision.
London	-	any type of injury, visible or complained of, caused by a collision; need not be treated at a hospital.
Mississauga	-	N/A
Montreal	-	any injury, apparent or not, to any person, caused directly or indirectly, by a motor vehicle.
Regina	-	any bodily harm, visible or complaint of, caused by the accident.
St. Catharines	-	any type of injury resulting from a collision.
Saskatoon	-	any bodily harm, visible or complaint of, caused by the accident.
Metro Toronto	-	injury must be reported when an injury occurs to any of the involved persons in a collision.
Vancouver	-	N/A
Windsor	-	any injury resulting from a motor vehicle collision.
Winnipeg	-	readily identifiable injury or perceived injury caused by a collision.



1992 Hamilton-Wentworth Collision Report

- Region of Halton - any bodily harm, visible or complained of, that results from a motor vehicle collision.
- Regional Ottawa-Carleton - injury is any bodily harm visible or complaint of, caused by a motor vehicle collision.
- Region of Peel - any bodily harm, visible or complained of, that results from a motor vehicle collision.
- Regional Waterloo - injury or death (no stipulation regarding severity of injury) caused by a motor vehicle collision.
- (a) Definitions of a "personal injury" such that a collision involving a personal injury must be reported.



Exhibit 6.8

FATAL COLLISION STATISTICS (a) NORTH AMERICAN CITIES

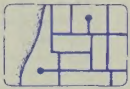
(Population 350,000 – 500,000)

CITY	FATALITIES 1991	RATE PER 100,000 POPULATION	RATE PER 10,000 REGISTERED VEHICLES
Minneapolis, Minn.	15	4.1	0.2
Virginia Beach, Va.	17	4.3	0.5
Baton Rouge, La.	18	4.7	0.5
Buffalo, N.Y.(1989)	18	5.0	0.6
Hamilton, Ont. (b)	18	5.8	0.8
Omaha, Neb.(1989)	24	6.5	0.8
Pittsburgh, Pa.	24	6.5	0.4
Seattle, Wash.(1989)	34	7.0	0.7
Cincinnati, Ohio	26	7.1	0.3
Denver, Colo.	35	7.5	0.5
Tulsa, Okla.	30	8.2	0.8
Oakland, Cal.	32	8.6	1.0
Long Beach, Calif.	39	9.1	1.0
Tucson, Ariz.	38	9.4	0.7
Austin, Tex.	46	9.9	0.9
Sacramento, Cal.	39	10.6	0.7
AVG. OF CITIES REPORTING		11.0	0.8
St. Louis, Mo.	46	11.6	0.5
Charlotte, N.C.	47	11.9	1.0
Toledo, Ohio (1989)	45	12.8	1.6
Albuquerque, N.M.	53	13.8	1.0
New Orleans, La.	73	14.7	2.1
Atlanta, Ga.	78	15.2	0.9
Miami, Fla.	61	17.0	0.5
Fort Worth, Tex.	77	17.2	1.3
Kansas City, Mo.	75	17.2	1.7
Oklahoma City, Okla.	83	18.7	1.6
Nashville, Tn.(1989)	93	21.9	3.5

COMPARED TO THE 26 NORTH AMERICAN CITIES REPORTING HAVING POPULATIONS IN THE RANGE 350,000–500,000, HAMILTON HAS THE FIFTH LOWEST RATE OF FATAL COLLISIONS BASED ON POPULATION. THE RATE IS ABOUT ONE–HALF OF THE REPORTED AVERAGE.

(a) SOURCE: Accident Facts, 1992 Edition,
National Safety Council, 1121 Spring Lake Drive, Itasca, Illinois

(b) Rate is for City of Hamilton only.



1992 Hamilton-Wentworth Collision Report

Exhibit 8.5

FATAL COLLISION STATISTICS NORTH AMERICAN CITIES			
Population in 1990: 250,000 - 500,000			
CITY	FATAL COLLISIONS PER 100,000 POPULATION	REGISTERED VEHICLES	RATE PER 100,000 POPULATION
Manassas, Va.	17	4.7	0.2
York, Pa.	17	4.7	0.2
Baton Rouge, La.	16	4.7	0.2
Butte, N.Y. (1989)	15	4.7	0.2
Madison, Wis. (1989)	15	4.7	0.2
Omaha, Neb. (1989)	15	4.7	0.2
Peabody, Fla.	15	4.7	0.2
St. Louis, Mo. (1989)	15	4.7	0.2
Green Bay, Wis.	15	4.7	0.2
Denver, Colo.	15	4.7	0.2
Thane, Calif.	15	4.7	0.2
Grand, Cal.	15	4.7	0.2
Long Beach, Calif.	15	4.7	0.2
Thane, Ark.	15	4.7	0.2
Austin, Tex.	15	4.7	0.2
Birmingham, Ala.	15	4.7	0.2
AVERAGE OF CITIES REPORTING			
St. Louis, Mo.	15	4.7	0.2
Omaha, Neb.	15	4.7	0.2
Tomb, Ohio (1989)	15	4.7	0.2
Augusta, N.Y.	15	4.7	0.2
New Orleans, La.	15	4.7	0.2
Albany, Ga.	15	4.7	0.2
Alam, Pa.	15	4.7	0.2
Fort Worth, Tex.	15	4.7	0.2
Kansas City, Mo.	15	4.7	0.2
Oklahoma City, Okla.	15	4.7	0.2
Nashville, Tenn. (1989)	15	4.7	0.2

COMPARED TO THE 25 NORTH AMERICAN CITIES REPORTING HAVING
POPULATIONS IN THE RANGE 250,000-500,000, HAMILTON HAS THE
FIFTH LOWEST RATE OF FATAL COLLISIONS BASED ON POPULATION.
THE RATE IS ABOUT ONE-HALF OF THE REPORTED AVERAGE.

(a) SOURCE: Hamilton County, 1992 Collision Report.
(b) Rate is for City of Hamilton only.

LOCATIONS

APPENDIX A.1

INITIAL IMPACT TYPES AS DESCRIBED IN EXHIBIT 2.6

FIELD #45 MOTOR VEHICLE COLLISION REPORTING SYSTEM

Initial Impact Type Diagram	Rear End	Head On	Side Swipe	Side Swipe	Side Swipe	Overtaking	Right Turn
Code Value	21	22	23	24	25	26	
Short Name #	REAREND	HEADON	SOSWPOP	SOSWPSM	OVERTAK	RTREND	

Right Turn	Left Turn	Left Turn	Intersection 90°	Right Turn	Right Turn
27	28	29	30	31	32
RTONCOM	LTONCOM	LTRREND	LTOPTHR	RTANGLE	RTSDSWP
					THR/RT

34	35	36	37	38	39	98
LTSOSWP	THR/LT	SMVPARK	SMVOTHR	VEH/PED	LTRTSWP	OTHER

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